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IMPROVING MOOD THROUGH ACCEPTANCE

OF EMOTIONAL EXPERIENCE

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IMPROVING MOOD THROUGH ACCEPTANCE OF EMOTIONAL EXPERIENCE

by

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Depression research demonstrates that self-focused processing, such as rumination, causes and maintains depressive disorders (Pyszczynski & Greenberg, 1987; Kuhl & Helle, 1986; Nolen-Hoeksema, 1987), while emotional processing literature shows beneficial effects to self-focus under some circumstances (Rachman, 1980; Foa & Kozak, 1986; Pennebaker, 1989). Therefore, it seems that self-focus is not inherently detrimental; rather, the way a person self-focuses could differentiate between unhealthy rumination and healthy emotional processing. Rude, Maestas, and Neff (2006) demonstrated that when the wording of a well-known rumination measure was altered to reduce judgment, the measure no longer correlated with depression. Mindfulness approaches that emphasize a non-judgmental acceptance of one's experience have produced beneficial outcomes (Baer, 2003), thus corroborating this finding.

This dissertation investigated the role of acceptance in emotional recovery from a distressing event. It was hypothesized that encouraging participants to process emotions

in an accepting manner would help them recover from a dysphoric mood more quickly than participants not given acceptance instructions or those given instructions to evaluate and change their emotions. Recovery was defined as return to baseline on measures of heart rate, skin conductance, skin temperature, self-reported positive and negative affect, and rumination (cognitive priming). In addition, the study investigated whether differences in the effects of emotional processing condition would be greatest for participants with low trait acceptance of emotions or high trait rumination.

As predicted, *Acceptance* participants reported less negative affect than *Control* participants at the end of the study. There were no significant differences on negative affect between *Acceptance* and *Evaluation* conditions, however. Hypothesized differences in recovery as measured by heart rate, skin conductance, skin temperature, positive affect, and rumination were not found. As predicted, trait rumination and emotional acceptance interacted with processing condition for negative mood and heart rate: *Acceptance* and *Evaluation* conditions reduced negative mood more than the *Control* group for participants low in trait Emotional Acceptance, and the *Acceptance* condition reduced heart rate for high ruminators more than the *Control* group. Interestingly, and contrary to prediction, *Acceptance* participants showed evidence of greater priming of failure-related words than the other two groups on the reaction time measure.

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Chapter One: Introduction

Self-focus in the form of rumination has been associated with depressive symptoms and has been found to predict major depressive episodes (Nolen-Hoeksema, 2000; Nolen-Hoeksema, Parker, & Larson, 1994; Nolen-Hoeksema & Morrow, 1991). Focusing on emotions or on the self after experiencing distressing events does not always seem to worsen distress, however.

Certain forms of emotional processing, which also involve self-focus, are thought to be important to psychological well-being. Rachman (1980) advocates facing emotional disturbances and processing them until the experiences no longer interfere with daily functioning and life. Similarly, Foa and Kozak (1986) advocate an approach to anxiety treatment in which clients fully experience anxious feelings in order to activate the fear memory that needs to be modified. Pennebaker's expressive writing paradigm (Pennebaker, 1989) suggests that processing emotional experiences is related to increased subjective and objective measures of health. In addition, encouraging emotional processing through different forms of writing has been shown to facilitate recovery from dysphoric mood (Hunt, 1998; Watkins, 2004) and to benefit depression vulnerable participants who were high in emotional suppression (Gortner, Rude, & Pennebaker, 2006).

Because both rumination and helpful forms of emotional processing involve turning thoughts inward, and rumination has been shown to be harmful while other forms of emotional processing has been shown to be helpful, it appears that self-focus may not be the detrimental component of rumination. Rather, it seems that a different component

of rumination must be responsible for its relationship to depressive symptoms and episodes. A premise of the current study is that the former (evaluative) style of self-focused attention corresponds to what is often meant by the term, "rumination" and that a second (non evaluative) style of processing is beneficial to emotional well-being.

In fact, Rude, Maestas, and Neff (2007) hypothesized that negative evaluations of mood might be the aspect of rumination that made this form of self-focus dangerous to mental health. These authors replicated a two-factor structure of the Ruminative Responses Scale (RRS, Nolen-Hoeksema & Morrow, 1991) that had been found by other authors (e.g., Treynor, Gonzalez, & Nolen-Hoeksema, 2003). The two factors, as labeled by Treynor et al. (2003), were Reflection and Brooding. As in prior studies, Rude et al. (2007) found that the Brooding factor was associated with poorer psychological adjustment. Rude et al. (2007) additionally noted that the Brooding factor appeared to have more items that seemed judgmental and critical than did the Reflecting factor.

The idea of non-judgmental acceptance of emotional experience is an important concept discussed in the study of mindfulness. Mindfulness is a state of mind that involves paying close attention to internal and external events without judgment. It has been incorporated into many different forms of therapy that have been shown to be effective in improving physical and mental health (Baer, 2003). Therefore, Rude et al. (2007) created a version of the RRS that de-emphasized negative evaluations of mood, and found that the Reflecting factor became uncorrelated with depression and more highly correlated with emotional processing. These results suggest that negative

evaluations may be an important factor in the relationship between rumination and depression.

The purpose of the current study was to examine the consequences of focusing on the self with either an accepting or evaluating attitude. This study examined the effects of processing a distressing experience with instructions to either accept the experience, to evaluate and try to change the experience, or without specific instructions (control). It was hypothesized that, over time, participants who were instructed to accept their emotional experience would return to baseline levels of mood, physiological arousal, and rumination more quickly than would participants with no emotional processing instructions (controls). These control participants in turn were expected to return to baseline levels of mood, physiological arousal, and rumination more quickly than participants who were instructed to evaluate and try to change their emotional experience. It was also hypothesized that the manipulation would interact with trait rumination and emotional acceptance such that the effect of the experimental manipulation would be enhanced for participants with high trait rumination and low trait emotional acceptance.

Chapter Two: Literature Review

This literature review will begin by discussing theories of depression that implicate problems with emotion regulation and that link these problems to rumination. Next, rumination, a form of self-focused processing which has been shown to be related to depression, will be discussed, followed by a discussion of the emotional processing literature and ways that self-focused processing has been shown to be beneficial in general, and for depression specifically. Next, the discussion will turn to recent theory and research on mindfulness and self-compassion, approaches that have been shown to be beneficial to psychological health. Finally, the review will discuss the idea of non-judgmental acceptance of emotions that appears to be a common component in self-focused processing that is psychologically beneficial.

Self-Regulation and Depression

Self-regulation theories of the etiology and maintenance of depression suggest that when a person encounters a stressor, the resulting negative mood serves as an indicator that something is wrong. An assumption common to each of the theories described in this section is that negative mood is a natural response to stress and frustration, but depression can develop as the person's attempts to self regulate are frustrated. These theories are relevant to the present study because rumination is one of the important effects posited to result from disruptions of emotion regulation.

Self-Regulatory Perseveration Theory

Pyszczynski and Greenberg (1987) presented a theory of depression that incorporates several of the major theories of depression, including the psychoanalytic,

control, cognitive, and behavioral perspectives. Their theory is called self-regulatory perseveration theory, which they describe as a diathesis-stress model. According to this theory, after a person loses someone or something in his life (i.e. death of a loved one, loss of job, end of a relationship, etc.), a self-regulatory cycle ensues. This cycle involves increased self-focus. Self focus leads to the realization that there is a discrepancy between the person's ideals and the person's reality. This realization produces negative affect, serving to motivate the person to reduce this discrepancy. If the person judges a low probability of successful discrepancy reduction, the person exits this self regulatory cycle and ceases to enact behaviors meant to reduce this discrepancy. This disengagement also allows the person to avoid further negative affect.

For example, a woman experiencing the dissolution of a romantic relationship may initially focus inward, thinking about losing the relationship and what that means for her life. She feels sad during this self-focus, because there is a disparity between her real and ideal self, and this negative affect motivates her to try to reduce this discrepancy. Upon notification that her partner is in a new romantic relationship, she realizes she cannot regain the loss, and begins to list all the aspects about her partner that she did not like. This allows her to exit the self-regulatory cycle, accepting the loss and eliminating the negative affect. However, according to Pyszczynski and Greenberg, when the object of the loss is central to the person's identity or self worth, the person becomes unable to exit this self-regulatory cycle, and continues with unhealthy and unproductive self-focus. A different woman in the situation above might have considered herself a good person because of her romantic relationship. When the relationship is over, she is unable to

accept the loss because it is so integrally tied to her identity, and so she continues to self-focus, trying to find a way to retrieve the lost love. This continued focus on the self compounds the negative affect, resulting in a depressive focusing style. This style of focus involves self-focusing in the face of negative events, but avoiding self-focus in the face of positive events, which increases the perception of and responsibility for the former, while decreasing the perception of and responsibility for the latter. This depressive focusing style solidifies a negative self-image. Initially, this self-image relieves the person from the effort of maintaining a positive self-image, as well as provides a clear and simple explanation for the negative experiences in the person's life. It also can serve as a buffer against future losses. Over time, however, the negative self-image and depressive focusing style result in the emotional, cognitive, and interpersonal symptoms of major depressive disorder that impair functioning.

Studies designed to test this theory have measured and manipulated the self-focus of depressed and non-depressed participants to investigate differences in cognitive and emotional patterns. Pyszczynski and Greenberg (1986) demonstrated strong support for the depressive self-focusing style described in the theory. They found that immediately after a failure experience, both sub-clinically depressed and non-depressed participants showed higher levels of self focus than immediately following a successful experience. In line with the theory, however, after a time delay and distraction, non-depressed participants showed higher levels of self focus after the successful experience than after the failure experience, while sub-clinically depressed participants continued to show higher levels of self focus in the failure condition relative to the success condition. In

addition, Pyszczynski, Holt, and Greenberg (1987) found that, in a self-focus condition, depressed participants exhibited more pessimistic thinking than non-depressed participants, expecting negative outcomes for themselves more than non-depressed participants expected negative outcomes for themselves. Interestingly, the authors found that in the external focus condition, this difference went away, and depressed and non-depressed participants had similar expectations for negative outcomes. In addition, depressed participants in the self-focus condition expected negative events to happen to themselves and to others equally, but in the external focus condition they exhibited a pattern more similar to non-depressed participants, such that they expected negative events to happen to themselves less than to others.

Degenerated Intention-Hypothesis

Kuhl and Helle (1986) proposed a cognitively based theory about the psychological factors causing depression, called the degenerated intentions hypothesis. The theory suggests that depression results from a person's inability to disregard degenerated intentions, which are goals that are no longer feasible or that the person is unable to attain. This leads to a state orientation, which then allows these intentions to intrude upon cognitive, motivational, and emotional functioning of daily life. These persistent degenerated intentions lock the person into the feeling of chronic sadness. The sadness is a normal human emotional response to not meeting a goal, but in people who can disengage themselves from this lost goal or degenerated intention, the sadness dissipates overtime. According to this hypothesis, state orientation that develops in a person suffering from depression allows cognitive capacity to be allocated to thoughts

about the degenerated intention, leaving less cognitive capacity for other types of cognitive processing, including the formation of new intentions.

In support of their hypothesis, Kuhl and Helle (1986) found that participants with a history of major depression were more likely than participants without a history of depression to interpret unrealistic instructions as an intention, which interfered with their ability to complete more realistic instructions later in the study. The authors also found that the higher the level of acute depressive symptoms participants experienced during the time of testing, the more the intention to comply with the unrealistic instructions interfered with their short term memory. In addition, Rholes, Michas, and Shroff (1989) found that participants who endorsed a state-orientation had a higher likelihood of being dysphoric and more negatively affected by adverse life events.

Response Styles Theory of Depression

Susan Nolen-Hoeksema's (1987) Response Styles Theory of Depression offers rumination as an explanation for the maintenance and recurrence of depressed mood. According to this theory, rumination describes "behaviors and thoughts that focus one's attention on one's depressive symptoms and on the implications of these symptoms" (Nolen-Hoeksema, 1991, p. 569). While her definition encompasses the idea of self-focusing in the presence of a negative mood, it emphasizes that the focus most often is on the mood itself, symptoms that it produces, and causes and consequences of the mood.

Nolen-Hoeksema (1987) originally developed her theory as a way of explaining the significantly higher rate of depression in women as compared to men that she encountered in various studies of depression. Of the studies she reviewed, which included

treated cases of depression both within and outside of the United States and community studies of depressive symptoms in the United States, females had a significantly higher incidence of diagnosed depressive disorder than men, at a mean ratio of 2.02:1. She proposed that the way that women respond to their depressed mood increases both length and severity of their mood, while the way that men respond to their mood results in a decrease in negative mood and less incidence of depression.

Nolen-Hoeksema and colleagues have conducted a number of studies on the relationship between rumination and depression. Studies show that women ruminate more in response to depressed mood than men, that they tend to experience more severe and prolonged depressed moods than men, and that when initial levels of depressed mood and response style are taken into account, the sex-differences in duration of depressed mood were no longer significant (Nolen-Hoeksema, 2004; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema et al., 1993).

Research has found that ruminators in general have longer lasting and more severe periods of negative mood. For example, in a study of college students, Nolen-Hoeksema et al. (1993) asked participants to monitor their daily moods for thirty days. They kept track of presence of negative mood, as well as length, severity, and response to the mood. The results demonstrated that the more participants engaged in ruminating responses to their moods, the longer the negative moods lasted. In another study, experimenters interviewed adults at one month and six months after the death of a close family member. They found that those who ruminated more after the loss rated higher on pessimism and had longer and more severe distress over time (Nolen-Hoeksema et al.,

1994). In another study, students at Stanford University were interviewed before, 10 days after, and 7 weeks after the Loma Prieta earthquake in California (Nolen-Hoeksema & Morrow, 1991). Those students who had more ruminative response styles before the earthquake were more depressed 7 weeks after the earthquake, and those who were depressed 10 days after the earthquake and ruminated more about the earthquake were more depressed 7 weeks after the earthquake.

In line with the Response Styles Theory, Ayuduck, Mischel, and Downey (2002) demonstrated that focusing attention away from the emotional components of a stressful situation, rather than focusing on the emotions experienced, resulted in more beneficial outcomes. In their study, they instructed participants to recall a significant and hurtful experience of rejection in their lives. The experimental manipulation involved random assignment to conditions, such that some participants focused on their emotions and bodily sensations during the event, being encouraged to relive and re-experience it, while other participants focused on the physical setting of the situation, encouraged to picture it as if they were right there, and a third control group was told just to imagine the event. The results indicated that participants in the emotional, or "hot focus" group had more access to hostility related words than the non-emotional, or "cool focus" group or the control group, higher self-reported angry mood than the "cool focus" group but not the control group, and higher content of anger and hurt in essays they wrote afterward than participants in the other two groups. The authors conclude that in response to the perception of rejection, emotional focus leads to more anger and hostility than strategies like distraction or distancing. However, it is important to note that this study did not

measure long-term effects of both “hot” and “cool” focus, and other studies have found that while emotional processing may increase negative arousal in the short term, in the long term there are emotional and physical health benefits (e.g. Pennebaker et al., 1988).

Emotional Processing

As is the case with rumination, the concept of emotional processing involves self-focus on affective states. Unlike rumination, however, emotional processing is believed to be a sign of emotional health, and is advocated in many traditional forms of psychotherapy. It has been studied in relation to anxiety disorder treatment, and its effectiveness has been demonstrated to improve health, mood, and general distress when encouraged through expressive writing.

Rachman (1980) defines emotional processing as “a process whereby emotional disturbances are absorbed and decline to the extent that other experiences and behaviour can proceed without disruption” (p. 51). He points to behaviorist strategies of successful fear reduction, such as modeling, desensitization, and flooding, as functioning to facilitate emotional processing. By having patients focus on the stimuli and emotions evoked by the stimuli repeatedly, their emotional experience can be absorbed, rather than continue to disrupt their lives. In fact, Rachman (1980) suggests that most instances of anxiety related psychopathology result from incomplete emotional processing, citing unpleasant intrusive thoughts, obsessions, and preoccupations, which are aspects of rumination, as some of the direct and indirect signs of incomplete emotional processing. He indicates that factors facilitating successful emotional processing include talk, calm rehearsals, catharsis, and repeated practice, while those that impede emotional processing

include avoidance, silence, agitated rehearsals, and distractions. Foa and Kozak (1986) have a similar view on anxiety reduction, advocating that the anxiety be present and fully experienced in order for successful emotional processing to occur. Baker and colleagues conducted a study that supported the hypothesis that, relative to non-patient controls, people who suffer from panic disorder have more emotional processing problems. Panic disorder patients also showed a tendency to try to control their emotional experience and expression more than controls, specifically for anxiety, anger, and unhappiness (Baker, Holloway, Thomas, Thomas, & Owens, 2004).

Pennebaker (1997) reviewed the findings of many studies that utilized a writing paradigm that appears to facilitate emotional processing. In these studies, participants who are randomly assigned to a condition where they write about an important emotional issue are compared to participants in a control condition who write about something unemotional. Participants in the experimental condition have shown healthier outcomes compared to controls in a number of different studies, across different ethnicities, education levels, and topics. Expressive writing in these studies has been associated with fewer doctor visits (e.g. Pennebaker & Francis, 1996), better immune functioning (e.g. Pennebaker, Kiecolt-Glaser, & Glaser, 1988), short term beneficial changes in heart rate and electrodermal activity (e.g. Hughes, Uhlmann, & Pennebaker, 1994), and long term improvements in self report of mood or distress (e.g. Greenberg, Wortman, & Stone, 1996).

Experimental Manipulations of Emotional Processing

Hunt (1998) applied the topic of emotional processing to depression by inducing a dysphoric mood in college students, then assigning them to one of three writing conditions: emotional processing, distraction, or disputation. Immediately after writing their first essay, there were no significant differences in mood in any of the conditions, which, Hunt suggests, gives evidence that even in the short term, emotional processing did not worsen mood compared to the other conditions. At each subsequent essay, participants in the distraction and disputation conditions did not differ significantly from each other on mood; however, at Time 2 processors felt significantly better than both groups, and at Time 3 processors felt significantly better than disputers, and marginally significantly better than distractors. After conducting a mean split based on post-induction mood scores, Hunt found that processors who felt the worst after the induction reported feeling best at Time 2, but there were no significant differences in the distractors or disputers. This study provides evidence that emotional processing can be effective in improving dysphoric mood, and is especially effective for those with more severe negative mood.

Watkins (2004) also investigated emotional processing in a depressed state. By incorporating concepts from the Interacting Cognitive Subsystems framework (ICS, see Teasdale, Segal, & Williams, 1995), Watkins (2004) hypothesized that in a dysphoric mood, certain modes of processing would be more beneficial than others. He induced dysphoric mood in college students, then randomly assigned them to one of two writing conditions: conceptual-evaluative or experiential. The conceptual-evaluative mode of processing corresponded to the propositional level of processing in the ICS framework,

described as "'thinking about' the self, focusing on discrepancies between current and wanted outcomes" (p. 1039). The experiential mode of processing corresponded to the implicational level of processing in the ICS framework, described as "non-evaluative, intuitive, direct experiential awareness of experience in the moment" (p. 1039). He found that participants who wrote in the conceptual-evaluative condition showed more thought intrusions and depressed mood than those who wrote in the experiential condition. The trait tendency to ruminate influenced the effect of the writing manipulation, such that approximately 12 hours after the mood induction when participants wrote for the second time at home, participants with more of a tendency to ruminate who wrote in the conceptual-evaluative condition showed increased negative mood, while those who wrote in the experiential condition showed a trend toward decreasing mood. His results suggest that different forms of emotional processing can have different effects on mood, and that rumination plays an important role.

In addition, Leary, Tate, Adams, Allen, and Hancock (2007) experimentally manipulated emotional processing to show benefits to processing emotions in a self-compassionate manner. In Study 5, participants were asked to describe details about a past experience of failure, rejection, or loss in writing, and then were assigned to one of four conditions. In two of the conditions, participants were asked to write in response to three prompts. One of these conditions induced self-compassion by addressing each of the three elements of self-compassion (common humanity, self kindness, and mindfulness) in a prompt. The other experimental condition induced self-esteem through three prompts designed to make them feel good about themselves. A writing control

condition asked participants to explore their deepest emotions about the event, and a control condition involved no writing at all. Participants who were assigned to write about their experience from a self-compassion perspective reported lower negative affect at the end of the study than those assigned to write about it from a self-esteem perspective or either of the control conditions.

Watkins and Teasdale (2004) also demonstrated that different forms of emotional processing could affect the performance of depressed participants on a test of overgeneral memory. They randomly assigned participants who met diagnostic criteria for depression to one of two self-focused processing conditions: analytical and experiential. Participants in the analytical condition were told to read a series of statements about an emotional experience while thinking of the "causes, meanings, and consequences" (p. 3) of the emotion or physical sensation. Participants in the experiential condition were told to read the same series of statements about an emotional experience while using their "imagination and concentration to focus your mind" (p. 3). The results showed that the participants in the experiential condition showed less overgeneral memory than those in the analytical condition, showing beneficial effects of one form of self-focused emotional processing.

In a study using the expressive writing paradigm, Gortner et al. (2006) addressed the benefits of emotional processing for depression vulnerable college students. Participants with a history of depression who wrote in the expressive writing condition reported less depressive symptoms 6 months after the experiment when compared to controls, but only when they were high in self-reported tendency to use emotional

suppression. The results also indicated that brooding, a component of rumination that entails negative judgments, fully mediated the effects of writing condition on depressive symptoms.

Mindfulness

Mindfulness has been described as "paying attention on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4). It is often developed using meditation exercises that focus on learning to pay attention to thoughts, feelings, and external events without being judgmental of them. Mindfulness instruction has been incorporated into many different kinds of therapy, and has been empirically studied more frequently in recent years. Bishop et al. (2004) proposed a two-component model in their operational definition of mindfulness, involving both focus of attention on the present, immediate experience and doing so in a way that is open and accepting of the experience. Acceptance appears to be one component of mindfulness that is beneficial, though other researchers argue that it is not a separate component (Brown & Ryan, 2004). In studies, approaches incorporating mindfulness have been shown to reduce stress, pain, and anxiety, as well as to help with binge eating and mood (Baer, 2003).

A study conducted by Broderick (2005) demonstrated the effectiveness of mindfulness when compared to rumination and distraction in helping participants recover from an experimentally induced dysphoric mood. Participants who were assigned to a condition where they participated in a meditation that emphasized self acceptance and awareness of breathing components of mindfulness showed significantly less negative affect than those assigned to a condition where they were distracted from their emotional

experience, who in turn had significantly less negative mood than participants assigned to a condition where they were encouraged to ruminate. Although the study did not distinguish between the effects of the acceptance portion of the mindfulness exercise and the present focus and breathing component, it appears that a combination of both can be effective in helping people recover from a dypshoric mood.

Teasdale and colleagues have applied the concepts of mindfulness to the treatment of depression. Teasdale (1985) hypothesized several ways that depression is maintained in the context of information processing theory. One of these hypotheses suggested that the state of being depressed itself might act to maintain depression. Similar to the idea of negative evaluations of mood, this idea suggests that, when depressed, a person tends to feel more depressed upon recognizing the aversive experience of depressive symptoms. He suggested that attacking this interpretation of depressive symptoms might be a key to depression intervention.

Teasdale and colleagues later developed a method of preventing depression relapse that incorporated the concept of mindfulness with more familiar cognitive therapy techniques, which they named Mindfulness Based Cognitive Therapy (MBCT) (Teasdale et al., 1995). In an evaluation of MBCT as a depression relapse prevention therapy, Teasdale and colleagues studied a sample of people who had a recent history of recurrent major depression and had been treated with antidepressant medications. Participants were randomly assigned to continue treatment as usual or, in addition to treatment as usual, asked to participate in group administered MBCT training. Experimenters found that for participants with three or more episodes of depression in their history, those in the MBCT

group relapsed at a significantly lower rate than those who completed treatment as usual (Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000).

Self Compassion

Another construct in the literature that involves contemplative, non-judgmental self-awareness and incorporates the concept of mindfulness is self-compassion (Neff, 2003b). Neff identifies three important components of self-compassion, including self-kindness, common humanity, and mindfulness, and found that self-compassion was significantly correlated with less depression and anxiety (Neff, 2003a). Self-compassion endorses acceptance of the self and one's experiences in both the self-kindness component and the mindfulness component. Studies have shown that self-compassion predicted lower levels of anxiety and was positively correlated with adaptive coping strategies of acceptance and positive reinterpretation and growth after the experience of perceived academic failure (Neff, Hsieh, & Dejitterat, 2005). In addition, Leary et al. (2007) demonstrated benefits to processing emotions in a self-compassionate manner, in the form of reduced negative affect.

Differentiating between Rumination and More Helpful Forms of Emotional Processing

With evidence that rumination and other forms of emotional processing that involve focusing on the self and negative mood can impact psychological health in opposite ways, the question of what makes one kind of self focus detrimental and the other beneficial begins to surface. Research on mindfulness and other self-focused approaches have demonstrated beneficial outcomes for emotional health, and these approaches appear to share a common component of non-judgmental acceptance of the

self and experience. Therefore, it seems probable that focusing on emotions in an evaluative, judgmental way may lead to increased and prolonged negative mood and depression, while focusing on the emotions without judgment, in an accepting way, may lead to faster recovery from negative mood and therefore reduce the likelihood of developing depression.

Some evidence for this point is found in a study by Treynor et al. (2003), who factor analyzed the Ruminative Responses Scale (RRS, Nolen-Hoeksema & Morrow, 1991), a widely used self-report scale of rumination, and found two factors. One factor contained items from the original scale that describe a way of trying to cope with symptoms of depression by a "purposeful turning inward to engage in cognitive problem solving" (p.256), which they labeled Reflection. The other factor contained items that described a way of coping with depressive symptoms that involved "a passive comparison of one's current situation with some unachieved standard" (p.256), which they labeled Brooding. The Reflection factor was associated with less depression in a longitudinal study, while the Brooding factor was associated with more depression over time. Other researchers have factor analyzed the RRS and found similar factors (Cox, Enns, & Taylor, 2001; Roberts, Gilboa, & Gotlib, 1998; Bagby and Parker, 2001). These results suggest that the brooding subcomponent of rumination as defined by Nolen-Hoeksema (1991), which seemed to involve evaluating negative mood, may be the more psychologically detrimental aspect of rumination.

In further support of this finding, Rude et al. (2007) noticed that many of the items on the Brooding scale appeared to involve negative judgments of emotional

experience. They hypothesized that negative evaluation might be the factor that makes rumination dangerous, and they created a version of the RRS that de-emphasized negative evaluations of mood. They found that their version of the RRS Reflection scale was uncorrelated with depression and more highly correlated with emotional processing than was the original Reflection scale, suggesting that negative evaluations may be an important factor in the relationship between rumination and depression.

Overview and Rationale for the Current Study

Mindfulness and other self-focused perspectives incorporate a way of paying attention to the self and surroundings in a non-judgmental way that has been shown to be beneficial for many psychological concerns including depression relapse. It seems likely, then, that the extent to which individuals negatively evaluate their negative moods might influence whether they become locked into ruminative patterns or are able to complete successful emotional processing.

The current study built upon the small existing literature examining the effects of different forms of emotional processing. It attempted to isolate the construct of emotional acceptance as a key factor in the difference between healthy and unhealthy forms of emotional processing. In order to do so, the study compared the effects of processing emotions after a failure experience in an accepting manner with processing emotions in a more evaluative, analytical manner, predicting benefits to the former and detriments to the latter. The study also utilized a control group that allowed for the comparison of the effects of particular processing interventions against participants' natural way of handling a failure experience. The current study also used physiological arousal measures in

addition to self-reported mood measures, as an additional way of assessing mood without the demand characteristics inherent in self-report. In addition, this study used a behavioral method of assessing rumination, which was designed to assess rumination without participants' awareness, thus also bypassing demand characteristics. Finally, in addition to trait rumination, the current study investigated the interaction of trait emotional acceptance with condition in an effort to identify a subset of participants for whom the intervention might be especially effective.

In the current study, it was hypothesized that participants in the *Acceptance* condition would recover more quickly (show higher positive mood, lower negative mood, less rumination, and less physiological arousal over the course of the study) from a negative mood induction than the *Evaluation* or *Control* groups, and that the *Control* group would recover more quickly than the *Evaluation* group. Building on the findings in the Watkins (2004) study that more vulnerable participants (high ruminators) were more impacted by processing condition, it was also hypothesized that participants with low trait emotional acceptance or high trait rumination would recover more slowly in the *Evaluation* condition, but more quickly in the *Acceptance* condition. This difference between conditions for participants with high trait rumination or low trait emotional acceptance was expected to be more pronounced than for participants with low to moderate trait rumination or moderate to high trait emotional acceptance.

Hypotheses for the Current Study

Hypothesis 1: At the end of the experiment, the *Acceptance* group will have lower heart rate, lower skin conductance, and higher skin temperature readings than the *Evaluation*

and *Control* groups, and the *Control* group will have lower heart rate, lower skin conductance, and higher skin temperature readings than the *Evaluation* group.

Hypothesis 2: At the end of the experiment, the *Acceptance* group will endorse less negative mood and more positive mood than the E*valuation* and *Control* groups, and the *Control* group will endorse less negative mood and more positive mood than the *Evaluation* group.

Hypothesis 3: At the end of the experiment, the *Acceptance* group will demonstrate less rumination about the RAT failure task than the *Evaluation* and *Control* groups, and the *Control* group will demonstrate less rumination than the *Evaluation* group. Rumination will be assessed using the Word Recognition task, and is operationally defined as recognition rates and reaction times for correctly completed failure related words when controlling for recognition rates and reaction times for correctly completed neutral words.

Hypothesis 4: The group differences predicted above will be most pronounced for participants who are low in trait emotional acceptance.

Hypothesis 5: The group differences predicted above will be most pronounced for participants who are high in trait rumination.

Chapter Three: Methodology

Participants

Participants were 108 (*51 males and 57 females*) University of Texas undergraduate college students who received course credit in an educational psychology class in which they were enrolled in the spring semester of 2006. Data collection for this study was in collaboration with the dissertation of another graduate student (see Barrow, 2006), who used the control group from the current study.

Completion of two phases of data collection was required for this study. Participants initially completed an online battery of questionnaires, and then scheduled an appointment for an in-person study session. Two hundred and two participants completed the online questionnaires. Of these 202 participants, 139 participants attended the in-person study session and 108 were included in analyses. Of the 63 participants who completed the online questionnaires but did not participate in the in-person study session, 24 contacted the researchers to indicate that they had scheduling conflicts that prevented them from being able to attend an available in-person session. These participants were given an alternative assignment to receive research participation credit in their Educational Psychology class. The remaining 39 participants failed to schedule an in-person study session after completing the online survey for reasons that are unknown.

Of the 139 participants who attended the in-person session, 31 were not included in data analyses. One participant was excluded from participation in the in-person session based on an elevated BDI score. Nineteen participants were excluded from data analyses after researchers concluded that they were aware of the deception component of the

study, and therefore not likely affected by the mood manipulation. Eleven additional participants were omitted from data analyses because one or more of their physiological indices produced scores that suggested equipment failure or invalid recording (e.g., loose sensors), or because their response pattern on one or more self-report measures suggested they had either misinterpreted instructions or were not taking the task seriously.

Therefore, the total sample used for the study included 108 participants, 51 males and 57 females, who completed both the online questionnaires and the in-person study session. The participants were randomly assigned to one of three groups: *Acceptance* of emotions, *Evaluation* of emotions, or a *Control* group. Due to the use of the *Control* group for the purposes of another study, more participants were assigned to this group (n=61) than to the *Acceptance* (n=26) and *Evaluation* (n=21) groups.

Manipulations

Failure Feedback Manipulation

In order to induce negative mood, participants were administered a modified version of the Remote Associations Test (RAT, Mednick, 1962). This method of negative mood induction was used successfully by Watkins (2004). The RAT was chosen for this study for several reasons. First, it offers the advantage of simplicity and speed of administration. Second, it offers face validity as a potential measure of problem solving ability and has been correlated to different cognitive abilities. It was originally designed as a measure of creativity (McFarlin & Blasovich, 1984). Therefore, it has good face

validity. In order to minimize harmful effects of the deception, experimenters described the test as a measure of problem solving skills rather than of intelligence.

The RAT administration involved presenting participants with a set of three words typed on a laminated card, all of which share a fourth word as a common associate. In order to solve the analogy, participants had to write this fourth word on their answer sheet. For example, presented with "soap, shoe, tissue," a participant had to generate the word "box" to successfully complete the analogy. McFarlin and Blascovich (1984) developed three versions of the test (success, failure, and control), based on the difficulty of the analogies within the test. Similar to the procedure used by Watkins (2004), participants in the current study were given 10 items from the failure condition. To increase the believability of the test, five extra difficult items were added. This was meant to insure that highly verbal participants were likely to get one or two items correct, thus making them more likely to believe this was a real test. The 15 items used in the RAT for this study are presented in Appendix A.

Participants were given 7.5 minutes to complete the 15 items, being presented with each item for 30 seconds. Prior to beginning the task, the experimenter referred participants to a scoring section at the bottom of their answer sheet with scoring norms, assuring them that the task is considered difficult, and that most people only get 7 to 9 items correct. These norms were a false set of norms constructed so that the mean was assumed to be out of reach of all participants. In reality, it was expected that participants would answer between one and two items correctly, referring to norms reported for the failure conditions of the Watkins (2004) studies. In the current study, participants

answered from 0 to 7 items correctly (M = 2.55, SD = 1.63). This is similar to findings in Brown & Dutton (1995), reporting mean number correct in failure conditions of two studies using undergraduate participants of 2.76 and 3.41.

Participants were encouraged to guess, even if they did not know the answer. The experimenter scored the test in view of the participant, then provided the participant with immediate performance feedback and circled their false percentile rank.

Emotional Processing Manipulation

Participants were randomly assigned to one of three emotional processing conditions: *Acceptance* of emotions, *Evaluation* of emotions, and *Control*. The manipulation took place in three parts. In Part 1, prior to experiencing the RAT failure manipulation, all participants viewed a presentation about emotions that was specific to their assigned condition. Part 2 was a writing phase in which participants were asked to apply the presentation information by writing in accordance with instructions designed to be consistent with their assigned emotional processing condition. Part 2 followed the RAT failure feedback. Part 3 of the manipulation was also a writing phase. While participants in each condition received identical instructions for this final writing phase, it was considered to be part of the emotional processing manipulation because it was designed to allow participants the opportunity to continue with emotional processing, with the hope that their processing would be influenced by the earlier, condition-specific instructions. Each of these manipulation components is described in more detail below.

<u>Part 1: Emotions Presentation</u>

This presentation provided information about emotion and, in the case of the *Acceptance* and *Evaluation* conditions, encouraged the use of the relevant emotional processing style. Participants in the *Control* condition viewed a rather dry and technical discussion of the psychobiology of emotions.

The slides in the *Acceptance* presentation were based on the concept of emotional acceptance in the literature. These slides instructed participants about the purpose and universality of emotional experience ("emotions such as sadness . . . are simply physiological responses to events. All humans experience this."), and encouraged them to accept their emotions without judgment ("Try to maintain a full awareness of the feeling without looking at it through a filter of judgment."). The slides in the *Evaluation* condition were designed to not encourage acceptance of emotions, but encouraged participants to analyze and evaluate their emotions ("Think about where these emotions come from . . . what they say about you as a person …Try to determine whether the emotional experience is good or bad.") and to take some kind of action to change or control them ("When negative feelings come into your mind, investigate them and try to change them if you can."). *Control* participants viewed slides that did not encourage emotional processing of any kind, but discussed theories of emotions ("Whereas Darwin, with his focus on the evolutionary functions of feelings, was concerned primarily with emotional expression - visible signs of feelings, James was concerned primarily with emotional experience, or the way individuals experience their feelings."). These slides were actually excerpts from a text on emotion theory (Cornelius, 1996), and were

selected because they seemed emotionally neutral and academic in tone. The text of the slides from each condition can be found in Appendices B, C, and D, respectively.

The presentation for each condition consisted of 26 PowerPoint slides, with 518 words on the *Acceptance* slides, 478 words on the *Evaluation* slides, and 533 words on the *Control* slides. An attempt was made to equate the presentations on the number of times the words or variants of "emotion" or "feelings" were mentioned in the slides. The *Acceptance* condition mentioned "emotion" or a variant 14 times, and "feel" or a variant 13 times. The *Evaluation* condition mentioned "emotion" or a variant 15 times, and "feel" or a variant 15 times, and the *Control* condition mentioned "emotion" or a variant 14 times, and "feel" or a variant 12 times. Each presentation took approximately five minutes to read. The slides between conditions had identical backgrounds, text size and font style.

Part 2: Writing According to Condition-Specific Instructions

The writing portion of the emotional processing manipulation involved having participants write in response to condition-specific instructions, which was similar to the method used in Watkins (2004) and Hunt (1998). In both of these studies, participants were assigned to conditions in which they wrote in response to prompts that guided them in a particular way of approaching their emotions after a failure experience. In the current study, participants wrote in response to prompts after a failure experience, though the content and structure of these prompts differed, in order to address the specific hypotheses of interest. The participants in the experimental conditions responded to prompts that encouraged them to process in either an accepting or evaluative manner,

while control participants wrote about any topic of their choice. Participants were encouraged not to worry about spelling, punctuation, or grammar but to write continuously until instructed to stop in response to each of two prompts. The prompts were spaced apart on one sheet of paper, and participants were instructed to begin writing in response to the first prompt, then when the experimenter told them to switch, to move immediately to the second prompt and begin writing. The experimenter allowed three minutes of writing in response to the first prompt, and five minutes of writing in response to the second prompt. Participants were encouraged to write for the entire time period allotted.

Acceptance Writing Instructions. The writing prompts in the *Acceptance* condition were based on prompts from a self-compassion manipulation (Leary et al., 2007), but were modified slightly to more appropriately fit the concept of acceptance. The first *Acceptance* prompt brought participants' attention to their emotions and associated physical sensations ("Notice the emotions that you are currently experiencing . . ."), while the second prompt normalized emotions and encouraged participants to accept their emotions without judgment ("As if you were writing a letter to friend, encourage yourself to accept the emotions you are experiencing. . ."). This prompt asked the participant to write to themselves as if they were writing to a friend, which was believed to further encourage acceptance of the emotional experience, in the way that a friendship relationship is generally viewed as accepting. The *Acceptance* writing instructions can be found in Appendix E.

Evaluation Writing Instructions. The *Evaluation* of emotions prompts were meant to mirror the style of writing in the *Acceptance* prompts, but were modified to elicit analysis and evaluation from participants. The first prompt brought attention to emotions, but immediately encouraged analysis and evaluation ("Analyze the feelings that you have right now."). The second prompt further encouraged writing about emotions in a judgmental manner, identifying those emotions that might be judged as interfering or unhelpful ("As if you are a teacher writing a letter to a student, write about which of your emotions should be discouraged . . ."). This prompt asked the participant to write as if a teacher writing to a student, which was believed to further encourage evaluation, in the way that teachers are typically in the role of evaluating students' performance. The *Evaluation* writing instructions are presented in Appendix F.

Control Writing Instructions. Both of the *Control* prompts instructed the participant to write about whatever the participant wanted to write about, in any style they wished to write ("Write about anything that you want to write about . . ."). They were given two prompts to allow for the same amount of writing time as the experimental conditions, broken up in the same manner. The prompts were designed to make their experience as similar to the experimental conditions as possible, without influencing their natural emotional processing style. The *Control* writing prompts are presented in Appendix G.

Part 3: "Free" Writing Phase.

This writing phase was identical for all participants. It was designed to allow participants more processing time, and it was anticipated that the Part 1 persuasive

presentation and Part 2 writing instructions would continue to influence their processing during this time. Participants were presented with a piece of paper with the heading "Writing 2" on it, and were verbally instructed to write about whatever was going through their minds. For exact writing instructions, see Appendix N, under the "Writing 2" subheading.

Measures

Mood

Beck Depression Inventory

The *Beck Depression Inventory* (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was administered in order to screen out participants who might be unduly vulnerable to the experimental manipulations. At the beginning of the in-person session, participants were screened with the BDI to determine current levels of depressive symptoms, and they were excluded from participation if they scored 20 or higher, or endorsed a response on the item assessing suicidal ideation (item 9) that indicated they would like to kill themselves or would kill themselves if they had a chance.

The BDI (see Appendix H) is a widely known 21 item self-report measure for detecting depression symptoms, and has been used in or researched in over 1,000 studies since it was first developed (Groth-Marnat, 1999). The scores on the scale range from 0 to 63, with higher scores indicating more depressive symptoms. Internal consistency ranges from .73 to .92 with a mean of .86, and depending on the interval between administrations, test-retest reliability ranges from .48 to .86. It has shown moderate to high correlations with clinical depression ratings for psychiatric inpatients, and moderate

correlations with other well known depression rating scales (Beck, Steer, & Garbin, 1988).

Positive and Negative Affect Schedule

In order to assess mood changes throughout the study, participants completed the Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988). The PANAS has a subscale measuring positive affect and a subscale measuring negative affect, each of which contain 10 items. Participants rate the extent to which a mood state had been experienced in a specified time period on a five-point scale (See Appendix I). Each subscale's scores range from 10 to 50. Both scales have demonstrated internal consistency, with Cronbach coefficient alpha ratings between .86 to .90 for the Positive Affect scale, and .84 to .87 for the Negative Affect scale. The Positive Affect scale significantly correlated negatively, while the Negative Affect scale significantly correlated positively, with the BDI (Beck et al., 1961). In the currently study, correlations between the PANAS and the BDI at baseline indicated that the Positive Affect scale was not significantly correlated with the BDI, but the Negative Affect scale was significantly positively correlated with the BDI (see Appendix T). The Negative Affect scale also significantly correlated with a measure of general distress in previous studies (Watson et al., 1988).

Physiological Arousal

Physiological arousal measures of heart rate, skin conductance, and skin temperature were measured by connecting participants to the J & J Engineering I-330-C2 6+ channel system. After asking participants to designate their non-dominant hand and

they were not allergic to rubbing alcohol, the experimenters cleaned the fingertips of the index and ring fingers of the participants' non-dominant hand, in order to remove excess oils, per instruction in the equipment manual. A small amount of conduction gel was then applied to the same fingers, as instructed in the manual, and then sensors were fastened to these fingers with Velcro cuffs. The hand was then strapped to a lap desk that participants were instructed to keep in their laps. After assuring that the participants felt comfortable with the tightness of the Velcro cuffs and straps, they were instructed to not move the non-dominant hand during the study, and informed that the lap desk was an attempt to remind them not to do so. This was done to minimize interference with physiological readings that might result from excessive movement and possible disconnection of the sensors.

Heart Rate

Heart rate was one measure of physiological arousal of interest in the current study, and was recorded in beats per minute. Increase in heart rate was interpreted as an increase in emotional arousal, as it has been shown to increase in stressful situations (Barger, Kircher, & Croyle, 1997; Svebak, Storjell, Dalen, 1982). Increased heart rate was expected to begin while participants were participating in the mood induction task and was expected to reach peak levels while participants were being given feedback about their performance. The extent to which heart rate remains elevated after the feedback was interpreted as the persistence of negative emotional arousal, while decreases in heart rate were interpreted as recovery from negative emotional arousal.

Skin Conductance

Skin Conductance was another index of physiological arousal used in the current study, measured in micromhos (uMhos) (Campell, 2004). Skin conductance has been shown to increase in stressful situations (Barger, Kircher, & Croyle, 1997, Pennebaker & Chew, 1985; Lanzetta, Cartwright-Smith & Kleck, 1976), and has been shown to more of a pure measure of physiological arousal than heart rate (Arriaga, Esteves, Carneiro, & Monteiro, 2006). Increase in skin conductance was interpreted as increase in emotional arousal, which, like heart rate, was expected to occur while participants were experiencing the mood induction task and was expected to peak when participants were being given feedback about their performance. The extent to which skin conduction remained elevated after the feedback was interpreted as the persistence of negative emotional arousal, while decreases in skin conductance were interpreted as recovery from negative emotional arousal.

Skin Temperature

The third index of physiological arousal used in the current study was skin temperature, measured in degrees Fahrenheit (Campell, 2004). Unlike heart rate and skin conductance, skin temperature has been shown to decrease in stressful situations (Rimm-Kaufman & Kagan, 1996; Svebak, Storfjell & Dalen, 1982; Bugental & Cortez, 1988). While decreases in temperature were expected in the current study, it is important to note that increases and decreases in skin temperature have been linked to specific emotions. For example, increases have been shown to be related to anger, while decreases have been shown to be related to fear (Levenson, et al., 1990; Stemmler, 1989). Decrease in skin temperature was interpreted as increase in emotional arousal, which was expected to

occur while participants were experiencing the mood induction task and was expected to peak when participants were being given feedback about their performance. The extent to which skin temperature remained depressed after the feedback was interpreted as the persistence of negative emotional arousal, while increases in skin temperature were interpreted as recovery from negative emotional arousal.

Non-Judgmental Acceptance

Kentucky Inventory of Mindfulness Skills

The Kentucky Inventory of Mindfulness Skills (KIMS, Baer, Smith, & Allen, 2004) is a 36 item self-report inventory designed for use in general and clinical populations that assess components of mindfulness in everyday life. Factor analysis indicated four factors: Observe, Describe, Act With Awareness, and Accept Without Judgment. The Accept Without Judgment Scale was the subscale of interest in the currently study (See Appendix J), and was used to assess participants' trait level of acceptance. It consists of nine items focusing on the respondents' tendency to be nonjudgmental about experience in the moment. Participants answered how true the statement was for them, on a scale from 1 (never or rarely) to 5 (almost or always), with scores ranging from 9 to 45. Baer, Smith, and Allen (2204) reported good internal consistency for the Accept Without Judgment subscale with a coefficient alpha of .87, and good test-retest reliability of .83. In the current study, the coefficient alpha was .90. The scale was significantly negatively correlated to the Neuroticism scale of the NEO-FFI (Costa & McCrae, 1992), the global severity index of the BSI (Derogatis, 1992), the Difficulty Identifying Feelings and Difficulty Describing Feelings scales of the Toronto

Alexithymia Scale (TAS-20, Bagby, Parker, & Taylor, 1993), and the Acceptance and Action Questionnaire (AAQ, Hayes, Strosahl, Wilson, Bissett, Batten, Pistorello et al., 2004).

Rumination

Ruminative Responses Scale

The trait tendency to ruminate was measured by the Ruminative Responses Scale (RRS), a scale on the Response Styles Questionnaire (RSQ, Nolen-Hoeksema & Morrow, 1991). The RRS contains 22 items asking participants to rate how often they respond in a certain way to a depressed mood on a four-point scale, with scores ranging from 22 to 88 (See Appendix K). Internal consistency reported by Treynor, et al. (2003) was high, with alpha coefficient of .90, and test-retest correlation of .67. In the current study, coefficient alpha was .91. The RRS was originally scheduled to be presented with the battery of online questionnaires assessing trait constructs, but was inadvertently omitted. When this error was caught, the decision was made to attempt to collect the measure in the in-person session, by adding it to the end of the study so that it did not interfere with any of the session variables of interest. In doing so, scores for 42 participants were obtained, providing a substantially smaller sample size for this variable than originally intended.

Leahy Emotional Schema Scale

The Leahy Emotional Schema Scale assesses emotional schemas (LESS, Leahy, 2002), and was included in the online battery initially as a measurement of interest for the other dissertation project. Due to the accidental omission of the RRS from the online battery, and the small number of participants that provided scores at the in-person session

on this measure of trait rumination, the decision was made to substitute scores on the Rumination subscale of the LESS, which also provided a trait measure of rumination. The version of the LESS used in the study (see Appendix L) consisted of 25 items that assessed six of the original 14 dimensions of emotional schemas. Participants rated how they have dealt with their emotions in the past month on a six-point scale from "very untrue of me" to "very true of me." The subscale of interest for the current study, the Rumination subscale, has been shown to have adequate convergent validity (Leahy, 2002) and consisted of five items, and scores can range from 5 to 30. Internal consistency for the current study resulted in a coefficient alpha of .53.

Behavioral (Word Recognition) Test of Rumination

Participants completed a word recognition task on the computer, in which both ability to recognize words and time taken to recognize words were measured as they solved incomplete words. This task served as a behavioral measure of rumination about the RAT feedback. It was believed that if participants were ruminating about the RAT feedback they received, words related to that task would be primed and therefore more easily accessible when participants were trying to find solutions to the incomplete words. This measure provided two indices of rumination: number of correctly answered RAT related words, taking into account number of correctly answered neutral words, and reaction time for correctly RAT related words, controlling for reaction time for correctly answered neutral words.

Forty words were presented one at a time in the center of the computer screen. These words were incomplete because one or more letters were omitted, and asterisks

appeared in place of the missing letters. For example, participants might see “c*f*e*”, which they could solve as “coffee.” Participants were told to press the space bar as soon as they recognized the word, and say the word aloud at the same time that they pressed the space bar. Twenty of the words were neutral (e.g. coffee), with a mean word length of 7.6 letters. Twenty words were considered semantically related to failure (e.g. disappoint) or found in the directions of the RAT task (e.g. association), with a mean word length of 8 letters.

Participants who were ruminating about the RAT task were expected to correctly solve more words that reminded them of the task itself or to the experience of failure, and their reaction times to these correctly answered words were expected to be faster than participants who are not ruminating. The number of correctly solved neutral words and the reaction time to correctly answered neutral words were used to control for individual differences in the ability to solve incomplete words in general.

The words used in the task were selected based on how participants in a small pilot study rated their semantic relation to failure, and three additional words found in the RAT instructions were added by agreement from three researchers. The way that the stimuli were presented was determined by researcher agreement and a small pilot study. Researchers agreed that stimuli with the initial letter of a word missing were high in difficulty, and so the decision not to make the first letter of any word a missing letter was implemented. In addition, a small group of participants rated how easy it was to solve different versions of the word. The different versions of the word had different amounts of missing letters, and the missing letters were in different locations. The stimuli selected

for the study were those participants rated at a moderate level of difficulty. The words selected for the word recognition task and the way they were presented on the computer screen are presented in Appendix M.

Procedure

A summary of the study procedures is provided in a flowchart in Appendix N. Participants first completed online questionnaires, and then they attended an in-person session. During the in-person session, they read and signed consent forms, then completed the BDI so that researchers could screen out participants with moderate to high levels of depressive symptoms. If included in the study, participants were randomly assigned to processing condition and then completed the first PANAS to measure their baseline mood. Then participants were connected to the physiological monitoring equipment and sat quietly for eight minutes to establish baseline measures of heart rate, skin conductance, and skin temperature.

Next, participants were given the RAT, and provided with feedback about their performance. They then viewed a presentation in their assigned condition. After the presentation they completed the second PANAS, then wrote for eight minutes in response to prompts in their assigned condition. They then sat for three minutes to allow time for their physiological measures to settle, in the event that the physical act of writing caused arousal elevations. Participants then completed the third PANAS, and then completed a second session of writing that was standard for all participants, regardless of condition. After sitting for three minutes, participants completed the final PANAS, and then completed the Word Recognition Task, which served as a behavioral measure of

rumination. They then were disconnected from the physiological monitoring equipment and were asked questions about their interpretation of study procedures. They were then debriefed, signed a second consent form, then were dismissed from the study.

Phase 1.

For the first phase of the study, participants were sent an email that directed them to a Survey Monkey website where they completed a battery of self-report questionnaires. These included the BDI, RRS, LESS, KIMS, and a demographic questionnaire. Embedded among these measures were several other questionnaires not relevant to this study, but part of the combined data collection effort with the Barrow dissertation. The online questionnaire portion of the study was referred to as the "Self-Description Questionnaires" study, and participants were told that, in order to receive full participation credit, they also needed to attend an in-person study session, entitled "Problem Solving." The two sessions were given separate names in an effort to convey that their purposes were not connected, in hopes of minimizing demand characteristics that might result from participants' awareness that emotional acceptance and emotional processing were central to the in-person study session. In the instructions for completing the online questionnaire, as well as on the last page of the survey, participants were notified that after they completed the questionnaires, they needed to sign up for the "Problem Solving" session, which lasted an hour and a half. In order to do so, they were directed to a website where they could sign up for the second portion of the study.

Phase 2.

In order to match participant data from the first phase with data from the second phase, participants were asked to enter a participant code for their survey that was later matched to the same code on their in-person session data. The in-person session was conducted by one of five female researchers (one of the two students who were collecting dissertation data, or one of three volunteer assistants who had recently received undergraduate degrees). Procedures for the in-person session were detailed in a script that experimenters followed, in order to assure standardization of study procedures. Each researcher or assistant role-played with another researcher on at least two occasions to facilitate comfort with the procedures and familiarity with the equipment. The script for the in-person study session is presented in Appendix O.

Upon arrival to the in-person session, participants were seated at a table with a closed laptop computer in front of them and were introduced to the study. They first read and signed the consent form, and then completed the BDI. While the experimenter stepped out of the room to score the BDI, participants completed the first PANAS, which served as a baseline measure of positive and negative mood. When the experimenter returned to the room, if the participant scored 20 or higher on the BDI or endorsed a two- or three-point response on the suicide question (item #9), the researcher notified the participant that s/he was excluded from participation. These participants were told that the study involved participating in a stressful task, and that based on their scores on the BDI, it appeared that they were already experiencing stress. The researcher expressed the desire to not expose them to mores stress through their participation in the study and took steps to notify the participant of campus mental health services available, or to contact

this service if necessary to ensure the participants' safety. Participants were then excused from the study and given full participation credit.

Participants who scored 19 or less on the BDI and endorsed a 0 or 1 on item 9 were eligible to continue participation, and were randomly assigned to one of three emotional processing conditions: *Acceptance* of emotions, *Evaluation* of emotions, or *Control*. These conditions were labeled with letters, which were coded on data collection packets and PowerPoint presentations, so that all five researchers could be blind to which condition the participant belonged. The key, identifying which condition corresponded to which letter, was developed by the dissertation chair, and was revealed to researchers only after the data collection was completed. It should be noted, however, that after several weeks of conducting the experiment, both dissertation students who were running subjects became aware of a portion of the key through unwitting participant disclosure and/or questions about the condition-specific materials.

Participants were then attached to the physiological monitoring equipment as described above under "Physiological Measures," and the experimenter monitored the recordings from a second laptop computer that faced away from the participant. The experimenter then moved to the back of the room, out of view of the participant, where she sat while the participant sat quietly for eight minutes to allow baseline physiological measures to be recorded. For the remainder of the study, the experimenter moved to the back of the room when participants were completing self-report measures, writing, or sitting quietly, in order to minimize interference.

Next, the experimenter introduced the RAT, explaining that it was a problem solving ability measure. The instructions were read from the script and, as described previously under "Failure Feedback," the participant was alerted to the norms on the score sheet and told the fabricated average performance on the task. The experimenter then walked the participant through a sample item, which was one of the easy items from the McFarlin and Blascovich (1984) study. The experimenter then began presenting the cards to the participant at the rate of one every 30 seconds. Following completion of the task, the experimenter scored the task in the participant's presence, marking a single slash through each item the participant answered incorrectly, then circling the number the participant got correct and the fabricated percentile rank that corresponded to it, telling the participant their score while pointing to the circled information.

In the next part of the study, participants were told, "now we're going to switch research focuses a bit" and were informed that they would read some information about emotions on a PowerPoint presentation. This was done in hopes of decreasing any connection participants might make between the recent failure task and the upcoming presentation that might alert them to the purpose of the mood induction. Then, the laptop in front of the participant was opened and the experimenter encouraged the participant to "pay attention to what is being said" while reading through the slides at the participant's own pace, and thinking "about the message that is being conveyed." The experimenter then started the presentation that corresponded to the participant's assigned condition. After the presentation ended, the participant completed the PANAS a second time.

Next, participants were given the forms corresponding to their assigned condition and asked to write in response to the written prompts. They were told to read the first prompt and write in response to it until the experimenter said "next," and at that point they were to read the next prompt and continue writing in response to it until the experimenter told them to stop. They were also referred to extra sheets of paper they could use if they ran out of space on their current sheet. After completion of this step, the experimenter asked the participant to sit quietly for a few minutes until notified by the experimenter of the next task. This interval was intended to allow the participant time to continue emotional processing, without having physiological movement interfere with arousal measurements. When three minutes passed, the participant then completed the third PANAS.

Participants were then asked to write for 10 more minutes, but this time they could write about anything that was on their mind. They were asked to write continuously until the experimenter told them to stop. When time expired, participants were asked to sit quietly for another few minutes, and the experimenter stopped them at then end of three minutes. The participant then completed the fourth and final PANAS.

Next, participants were introduced to the Word Recognition task and given directions about how to indicate their answers to the items. They were encouraged to press the space bar and say the word simultaneously in order for the researchers to get the best estimate of their reaction time. The experimenter started the program, and then observed the participant complete a practice trial consisting of three words to solve. There was a pause after the first practice trial for any questions from the participant, and

then the participant completed a second practice trial consisting of four words to solve. There was another opportunity for questions, and if the experimenter was satisfied that the participant understood the directions, the actual test items were started. The experimenter sat behind the participant and wrote down the answers the participant said aloud.

The participant was then disconnected from the physiological monitoring equipment. The 42 participants who received the RRS (when experimenters realized the omission of this trait measure from the online questionnaires) were asked to complete it at this time.

The experimenter then asked the participants a set of questions to determine if they were aware of any aspect of the study that would be reason for exclusion. This probing sheet is included in Appendix P. Participants were then debriefed about the true purpose of the study, given an explanation of the purpose of RAT and informed of the deception component. The experimenter answered any questions, then asked the participant to sign a second consent form indicating that they were informed of the deception and still agreed to have their data used in the study. Participants were also asked not to discuss the true purpose of the study with classmates or other potential participants until after the end of data collection. They were provided a participation receipt for course credit, and dismissed from the study.

Chapter Four: Results

Sample Characteristics

Analyses were conducted to test for any significant differences between the 108 included participants and the 31 excluded participants on demographic variables. Due to low numbers of participants in categories for year in school, ethnic identification, and race, Pearson Chi-Square analyses could not be conducted for these variables. Race and ethnic identification were recoded into dichotomous variables, such that participants' answers were categorized as either white or non-white, and as either endorsing or not endorsing an ethnic identification. Chi-square analyses indicated there were no significant differences between the groups on endorsement of white vs. non-white racial categories [$\chi^2<1$], or endorsement or non-endorsement of a particular ethnic identity [$\chi^2<1$]. Analysis of age differences using a one way ANOVA indicated no significant differences between groups [$F < 1$]. Chi-square analyses indicated a significant difference between included and excluded participants on gender [$\chi^2(1, N=139) = 5.45$, $p=.02$]. The excluded participants were more likely to be male than female, with proportions of .71 and .29, respectively.

Appendix Q presents the demographic breakdown of the included participants in each condition. Analyses of demographic variables between conditions indicated that there were no significant differences between conditions for gender [$\chi^2<1$] or age [$F < 1$]. Due to low numbers of participants in categories for year in school, ethnic identification, and race, Pearson Chi-Square analyses could not be run for these variables; however, Pearson Chi-Square analyses on race and ethnic identification when recoded

dichotomously indicated there were no significant differences between conditions for white vs. non-white racial categories [$\chi^2<1$], or participants who endorsed an ethnic identification and those who did not [$\chi^2<1$].

Descriptive Statistics

Trait Measures

In Phase 1 (prior to participation in the in-person study sessions), participants completed a total of eight self-report questionnaires in an online survey. The majority of these questionnaires assessed constructs that were relevant to Barrow's (2006) dissertation study; however, the current study utilized two of the eight questionnaires. The questionnaires used in the current study were the Accept Without Judgment Subscale of the Kentucky Inventory of Mindfulness (KIMS), and the Rumination subscale of the Leahy Emotional Schema Scale (LESS). The Accept Without Judgment subscale of the Kentucky Inventory of Mindfulness (KIMS) was used to assess the construct of trait acceptance of emotions. The Rumination subscale of the Leahy Emotional Schema Scale (LESS) was used to assess trait rumination. Originally, the Ruminative Responses Scale (RRS) was selected to serve as the trait measure of rumination, but it was inadvertently omitted from the online questionnaires at Phase 1. When researchers discovered the omission, the RRS was added to the end of the in-person session in an attempt to obtain a trait measure of rumination, without interfering with study procedures. Because of the introduction of this solution late into the data collection process, the RRS was only obtained for 42 of the included participants, resulting in a smaller sample size than the other trait measures. Due to this omission, the current study utilized data from the

Rumination subscale of the LESS, which had originally been included in the online survey for the purposes of the other study. Descriptive statistics for these trait measures are presented in Appendix R.

In order to assure there were no significant differences between conditions on trait measures of rumination and emotional acceptance, a series of univariate analyses of variance (ANOVAs) were conducted. As expected, the conditions did not differ significantly on any trait measures, including trait rumination as measured by the Ruminative Responses Scale (RRS) and the Rumination subscale of the Leahy Emotional Schema Scale (LESS), and trait emotional acceptance as measured by the Accept without Judgment subscale of the Kentucky Inventory of Mindfulness (KIMS), all p's > .05. Pearson correlations were computed to determine relationships among these trait measures. The results are presented in Appendix S, revealing statistically significant correlations among all of the trait measures. Reliability coefficients were calculated for these measures, and the results are presented in parenthesis in the diagonals of Appendix S. The RRS and the KIMS Accept without Judgment subscales have adequate reliability, while the LESS Rumination subscale did not. The low reliability was most likely due to the scale consisting of only five items.

Baseline Measures

At the beginning of the in-person study session, prior to the mood induction and emotional processing intervention, participants were given the Beck Depression Inventory (BDI) in order screen out participants who were already experiencing moderate to high levels of depressive symptoms. For a flowchart of study procedures, see

Appendix N. In addition, the BDI scores provided a baseline level of depressive symptoms for participants who remained in the study. Baseline measures of mood were also obtained, both through self-report, using the Positive and Negative Affect Schedule (PANAS), and physiological measurements of heart rate, skin conductance, and skin temperature taken prior to the mood induction and the emotional processing intervention.

In order to investigate differences between conditions on baseline measures of mood, a series of univariate analyses of variance (ANOVAs) were conducted. Despite random assignment to conditions, and using the Welch statistic due to inequality of variances across groups, a significant difference was found between conditions on the baseline measure of skin temperature, $F'(2, 43.74) = 5.15$, $p = .01$. Post hoc analyses using Dunnett C comparisons revealed that the participants assigned to the *Acceptance* condition had significantly lower baseline temperatures than participants assigned to the *Control* condition. The conditions did not differ significantly on any other baseline measures, including baseline level of depressive symptoms as measured by the Beck Depression Inventory (BDI), baseline positive and negative mood as measured by the Positive and Negative Affect Scale (PANAS), and baseline physiological measures of heart rate and skin conductance, all p's $> .05$. Pearson correlations were computed to determine relationships among these baseline measures. The results are presented in Appendix T, revealing a significant correlation between the baseline BDI scores and baseline negative affect as measured by the PANAS.

Physiological Dependent Variables

Once participants were connected to the physiological measuring equipment, measures of heart rate, skin conductance, and skin temperature were continuously measured in 30-second intervals. Six measurement phases were of interest in the current study. The phases of interest were baseline (prior to mood induction and emotional processing intervention), RAT feedback (the end of the mood induction, where physiological measures were expected to show peak arousal), Writing 1 (after PowerPoint presentation and during first written application of emotional processing instructions), Sitting 1 (during resting period after first writing session), Writing 2 (during second written application of emotional processing instructions), and Sitting 2 (during resting period after second writing session). The length of time of each measurement phase was as follows: baseline = eight minutes, RAT feedback = approximately one minute, Writing 1 = eight minutes, Sitting 1 = three minutes, Writing 2 = 10 minutes, and Sitting 2 = three minutes. The median of each of these phases was calculated for each participant and used as the dependent variable, providing a measure of central tendency that was not influenced by extremely high or low values.

Four participants did not have heart rate, skin conductance, or skin temperature readings for any point in the study due to equipment failure. One additional participant did not have heart rate, skin conductance, or skin temperature readings for the Sitting 2 phase, and one participant did not have heart rate, skin conductance, or skin temperature readings after the RAT feedback phase, due to experimenter error. Physiological readings that were statistical outliers, but not so far out of range as to suggest invalid responses,

were not deleted, but "windsorized." This procedure involved changing the raw outlier value by making it one unit higher or lower than the next most extreme value in the distribution for that variable (see Tabachnick & Fidell, 2007). This way, the data point maintains its position in the distribution, but does not so drastically influence the mean. Appendices U, V, and W provide descriptive statistics for the three physiological measures in each condition over time. Pearson correlations among each administration of each physiological variable across the six phases of the study are presented in Appendices X, Y, and Z. Heart rate measures at each point in the study were expected to be significantly correlated, as were skin conductance and skin temperature. Skin conductance and skin temperature measures followed this pattern, and appear to be stable measurements. With the exception of a significant correlation between heart rate during the Writing 2 and Sitting 2 study phases, heart rate measures were not significantly correlated throughout the six study phases. This finding suggests that heart rate is not a stable measure, as discussed in Sückfull (2000).

Mood Manipulation Check

In order to test for the effectiveness of the mood induction, paired-samples t-tests were run to determine whether physiological measures changed significantly from before to after the failure feedback from the Remote Associates Test (RAT). As previously indicated, heart rate and skin conductance were expected to increase as a result of the mood manipulation, while temperature was expected to decrease. The results indicated that the mean heart rate at the RAT feedback phase ($M = 120.50$, $SD = 21.23$) was not significantly different than the mean heart rate at baseline ($M = 117.74$, $SD = 7.09$),

$t(103) = 1.30$, $p = .20$, contrary to expectations. The mean skin conductance at the RAT feedback phase ($M = 6.17$, $SD = 2.31$) was significantly higher than the mean baseline skin conductance ($M = 4.52$, $SD = 2.10$), $t(103) = 12.00$, $p < .01$, as was expected. The results for skin temperature were also significant, though not in the expected direction. The mean skin temperature at the RAT feedback phase ($M = 77.04$, $SD = 3.20$) was significantly higher than the mean skin temperature at baseline ($M = 76.52$, $SD = 3.30$), $t(103) = -3.15$, $p < .01$.

An additional check for effectiveness of mood induction involved conducting paired samples t-tests, looking at the change in self-reported positive and negative mood from baseline to the second mood measure, but in the *Control* group only. Due to the study design, the second self-report mood measure did not immediately follow the failure feedback, but was assessed immediately following the emotions presentation (see Appendix N for study procedure flowchart). Since the persuasive presentation was one of two components of the emotional processing manipulation for the experimental groups, change between baseline self-report of mood and the second self-report of mood would not accurately reflect the effects of the mood induction. The second score would be affected first by the RAT feedback and then by the beginning of the emotional processing manipulation. In contrast, since the *Control* group was shown a presentation designed to have no effect on emotional processing and was considered mood neutral, their presentation was not expected to affect their mood. Therefore, changes between baseline and the second administration of the PANAS should accurately assess the effects of the mood induction for this condition.

Results for the *Control* group indicated that the mean self-reported positive affect at the second PANAS administration (M=20.85, SD=6.71) was significantly lower than the mean self-reported positive affect at the baseline administration (M=23.75, SD=7.65), $t(60) = -5.42$, $p < .01$, providing evidence for effectiveness of the mood induction. Similarly, mean self-reported negative affect at the second PANAS administration (M=14.95, SD=5.49) was significantly higher than mean self-reported negative affect at baseline (M=13.21, SD=4.25), $t(60) = 3.73$, $p < .01$, also providing evidence for the effectiveness of the mood induction.

Self-Report Mood Dependent Variables

Participants completed the Positive and Negative Affect Schedule (PANAS) at four points in the study. The scale produces scores for positive (PA) and negative (NA) affect, and so there were eight total measurements of self-reported mood throughout the study (PA1, NA1, PA2, NA2, PA3, NA3, PA4, NA4). The first PANAS was completed as a baseline measure, prior to the mood induction or the experimental manipulation. The second PANAS was completed immediately after participants saw the presentation for the condition to which they were assigned. The third PANAS was completed immediately after the first sitting phase, and the final PANAS was completed immediately after the second sitting phase. Descriptive statistics for the PA and NA subscales of the PANAS at each of the study phases by condition are presented in Appendices AA and BB. Pearson's correlations among the PANAS subscales administered throughout the study are presented in Appendix CC, and correlations among the PANAS subscales and the corresponding physiological measurements are reported in

Appendix DD. The positive affect (PA) subscales are significantly correlated, and the negative affect (NA) subscales are significantly correlated over the four study phases, but the subscales are not significantly correlated with each other. In general, the physiological measures of arousal and self-report measures of mood were not significantly correlated, though 15 of the 144 correlations reached significance. This result has been reported in other studies using both types of measures (Coventry & Constable, 1999; Wofford, 2001), although significant correlations between self-report and physiological measures have been reported (Coventry & Hudson, 2001). Cronbach's alpha reliability coefficients were calculated for the PANAS subscales for each administration, and are listed in parenthesis in the diagonals of Appendix CC. These coefficients indicate that the PANAS subscales are stable measures.

Behavioral Rumination Dependent Variables

In order to measure rumination behaviorally, participants were asked to complete a Word Recognition task on the computer after the final PANAS. The task presented forty words on the computer screen. Each word had one or more letters missing, and asterisks replaced these letters. Half of these words could be completed with words related to the failure experience, either because they came directly from the instructions of the RAT, or because when piloted, they were considered to be related to feelings of failure. The other half of the words could be completed with neutral words, meaning words that were not in the instructions of the mood induction task, and when piloted, were not considered to be related to feelings of failure. Participants were instructed to press the spacebar when they recognized the word on the screen and to simultaneously

say the word aloud that they believed completed the incomplete word on the screen. They completed a series of seven practice trials to be sure that they understood and could follow the directions to the task. Experimenters noted correct and incorrect verbal responses as the participant solved the words aloud, and the computer program tracked their reaction times based on when they pressed the space bar.

Because the purpose of this measure was not to detect word recognition accuracy, per se, but to assess the degree to which RAT failure feedback related words were mentally primed for participants, the decision was made to count as correct several responses that were not technically correct but were similar in meaning and were nearly correct. Responses were counted as correct if they contained the same root word and differed by only a few letters. For example, one of the stimulus words (a RAT related word) was, "confusing" and was presented as "c*nf*s*n*." Participants were given credit if they answered, "confusion."

The rumination task provided four variables of interest: total number of RAT related words answered correctly and mean reaction time for correctly answered RAT related words, as well as the total number of neutral words answered correctly and mean reaction time for correctly answered neutral words. Separate reaction time distributions for RAT-related and neutral related words for each individual participant showed that these distributions did not deviate substantially from the normal distribution. In particular, skewness was within reasonable bounds, suggesting that the mean was an appropriate measure of central tendency to use. The neutral variables were used as

covariates in subsequent analyses, in order to control for participants' individual differences in ability to solve incomplete words in general.

Due to the fact that the Word Recognition task was created for the present study, the difficulty of identifying the partially obscured words was not well-calibrated and a number of the words were identified by very few of the participants. For the measure of mean reaction time, a decision was made to only include words that had fairly high recognition rates overall, since including reaction times for words that only a small subset of participants recognized introduces distortion and detracts from the aim of capturing facility of recognition with this index. Therefore, only reaction times for words that were answered correctly by at least 70 percent of participants were used to calculate the mean reaction times for participants. The 70 percent threshold was chosen because it represented a compromise between the goals of retaining a large number of words and of limiting the index to words that were recognized by the majority of participants. Appendix M shows the frequencies with which each of the stimulus words were correctly identified by participants within each condition. Appendix EE provides group means and standard deviations for each of the four word recognition variables.

Examination of Hypotheses

In the first three hypotheses, it was predicted that, compared to the *Control* and *Evaluation* conditions, the *Acceptance* condition would recover more rapidly from the distress induced by the RAT failure feedback. In addition, it was predicted that the *Control* condition would recover more rapidly than the *Evaluation* condition. Recovery was defined as return to baseline levels on each of several different indices: physiological

arousal (heart rate, skin conductance, and temperature), self-reported mood (positive and negative affect) and a reaction time measure of rumination.

Hypothesis 1: Physiological Indices of Emotion

The first hypothesis pertained to the physiological measures of emotional functioning. This hypothesis was that participants assigned to the *Acceptance* condition would recover from the RAT failure feedback more quickly than participants assigned to the *Control* group or the *Evaluation* group, and that the *Control* group would recover more quickly than participants assigned to the *Evaluation* group. Recovery from the negative mood induction for this hypothesis was defined as decreased heart rate, decreased skin conductance, and increased skin temperature over time.

In order to assess group differences in change in physiological arousal over time, three repeated measures analyses of variance (ANOVA) were run, each examining changes in one of the three physiological dependent variables (heart rate, skin conductance, and skin temperature) over the six measurement times of interest (baseline, RAT feedback, Writing 1, Sitting 1, Writing 2, and Sitting 2). The three emotional processing groups (*Acceptance*, *Evaluation*, and *Control*) were between-subjects variables. In other words, each analysis used a between subjects factor of emotional processing condition, a within subjects factor of time, and a dependent variable of one of the three physiological arousal measures. Because differences were expected to emerge over time, but there was no prediction as to when the differences would emerge, post-hoc comparisons were conducted to explore any significant interactions between emotional processing condition and time.

Heart Rate. In the analysis of heart rate change over time, Mauchly's test of sphericity indicated that the sphericity assumption was violated. Based on the size of the epsilon value produced, the more conservative Greenhouse-Geisser adjustment is reported. For this analysis, there was no significant main effect for time [$F(2.69, 265.79) = 1.92$, $p = .09$] or condition [$F(2, 99) = 1.98$, $p = .14$]. Contrary to prediction, there was no significant interaction between time and emotional processing condition [$F(5.37, 265.79) = .92$, $p = .48$]. For a graph of the group means for heart rate over time, see Appendix FF.

Skin Conductance. For the analysis of the dependent variable of skin conductance, the sphericity assumption was also violated and the Greenhouse-Geisser adjustment is reported. There was a significant main effect for time [$F(1.62, 159.97) = 61.07$, $p < .01$], but no significant main effect for condition [$F(2, 99) = .37$, $p = .70$]. There was also no significant interaction between time and condition [$F(3.23, 159.97) = .35$, $p = .80$]. For a graph of the group means for skin conductance over time, see Appendix GG.

Skin Temperature. For the analysis of the dependent variable of skin temperature the sphericity assumption was also violated, and the Greenhouse-Geisser adjustment is reported. The results indicate a significant main effect for time [$F(2.75, 272.45) = 5.23$, $p < .01$] but no main effect for condition [$F(2,99) = 1.76$, $p = .18$], or interaction of condition and time [$F(5.50, 272.45) = 1.62$, $p = .15$]. The graph of the group means for skin temperature over time is presented in Appendix HH.

Hypothesis 2: Self-Reported Mood

The second hypothesis pertained to self-reported mood. This hypothesis was that participants assigned to the *Acceptance* condition would show a faster rate of increase in positive mood and decrease in negative mood than participants assigned to the *Control* group over the course of the study, and the *Control* group would show a faster rate of increase in positive mood and decrease in negative mood than participants assigned to the *Evaluation* group.

In order to assess group differences in change in self-reported mood over time, two repeated measures analyses of variance (ANOVA) were run, each looking at changes in one of the two subscales of the PANAS (positive affect and negative affect) over the four measurement times of interest between the three emotional processing groups (*Acceptance*, *Evaluation*, and *Control*). Therefore, each analysis used a between subjects factor of emotional processing condition, a within subjects factor of time, and a dependent variable of either positive or negative affect. Because differences were expected to emerge over time, but there was no prediction as to when the differences would emerge, post-hoc comparisons were conducted to explore any significant interactions between emotional processing condition and time.

As with the previous analyses, the sphericity assumption was violated for the repeated measures analysis of self-reported positive affect. The Greenhouse-Geisser adjustment is reported, indicating a significant main effect for time [$F(2.07, 217.54) = 51.44$, $p < .01$], which appears from an examination of Appendix II to be due to the decrease in positive mood that occurred for all conditions across the study session. There was no significant main effect for condition [$F(2,105) = 1.30$, $p = .28$] and the

hypothesized interaction between time and condition was not found [$F(4.14, 217.54) = 1.36$, $p = .25$]. Group means for self-reported positive affect over time are presented graphically in Appendix II.

The analysis of self-reported negative affect across time between conditions indicated that sphericity was violated, but the size of the epsilon value indicated the more appropriate use of the less conservative Huynh-Feldt adjustment, which is reported here. This repeated measures analysis indicated a significant main effect for time [$F(2.58, 270.51) = 4.55$, $p < .01$, but no significant main effect for condition [$F(2,105) = 1.56$, $p = .22$. The interaction between time and condition reached marginal significance [$F(5.15, 270.51) = 2.00$, $p = .08$. Post-hoc analyses revealed a significant difference between groups at the final administration of the PANAS [$F(2, 105) = 3.60$, $p = .03$]. After using the Bonferroni adjustment for multiple comparisons, and adjusting for inequality of variances, participants in the *Acceptance* condition (M = 11.65, SE = .35) reported significantly lower negative affect than participants in the *Control* condition (M = 13.82, SE = .59), with a mean difference score of 2.17 [$t(84.88) = 3.30$, $p = .04$]. There was no significant difference between the *Acceptance* condition (M = 11.65, SE = .35) and the *Evaluation* condition (M = 12.43, SE = .62) after adjusting for multiple comparisons and inequality of variances, with a mean difference score of .78 [$t(31.82) = 1.09$, $p = 1.00$]. There was also no significant difference between the *Evaluation* condition (M = 12.43, SE = .62) and the *Control* condition (M = 13.82, SE = .59) after adjusting for multiple comparisons, with a mean difference score of 1.39 [$t(80) = 1.36$, $p = .40$]. A graph of the group means for self-reported negative affect over time is presented in Appendix JJ.

Hypothesis 3: Behavioral Measure of Rumination

The third hypothesis addressed the expected differences in rumination about the RAT feedback task between emotional processing groups. The dependent variables of interest in this hypothesis included total number of correct RAT related words completed and reaction time to correctly answered RAT related words. It was hypothesized that participants in the *Acceptance* processing condition would answer fewer RAT related words correctly and have slower reaction times to correctly answered RAT related words than the *Evaluation* or *Control* groups, which would mean that they were ruminating less about the task than the other groups. It was also hypothesized that *Control* group would identify fewer RAT related words correctly and have slower reaction times to RAT related words) than the *Evaluation* group. In order to test this hypothesis, two one-way analyses of covariance (ANCOVA) were conducted. The independent variable in each analysis was emotional processing condition (*Acceptance*, *Evaluation*, and *Control*). In one ANCOVA the dependent variable was total number of RAT related words answered correctly, and the covariate was total number of neutral words answered correctly. In the other ANCOVA the dependent variable was reaction time to correctly answered RAT related words, and the covariate was reaction time to correctly answered neutral words.

Preliminary analyses of the assumption of homogeneity of slopes indicated that the relationship between the dependent variable and the covariate in each analysis was not significantly different as a function of the independent variable, [$F(2,102) = .37$, $p = .69$ for the analysis of total number of correct RAT related words] and [$F(2,101) = 1.92$, $p = .15$ for the analysis of reaction times to correctly answered RAT related words]. The

analysis of the total number of RAT related words answered correctly when controlling for total number of neutral words answered correctly indicated no significant difference between emotional processing conditions [$F(2,104) = .66$, $p = .52$]. For a graph of the RAT related words correct for each condition, see Appendix KK.

The analysis of the reaction times for correctly answered RAT related words when controlling for reaction times to neutral words indicated a marginally significant difference between emotional processing conditions [$F(2,103) = 2.58$, $p = .08$]. Post hoc comparisons indicated that the *Acceptance* group had significantly faster reaction times to RAT related words than the *Control* group [$F(1,103) = 4.41$, $p = .04$], and marginally significantly faster reaction times to RAT related words than the *Evaluation* group [$F(1,103) = 3.53$, $p = .06$]. The *Evaluation* group and the *Control* group reaction times to RAT related words were not significantly different [$F(1, 103) = .07$, $p = .80$]. Appendix LL presents a graph of the reaction times for correctly answered RAT related words for each emotional processing condition.

In the last two hypotheses, it was predicted that trait emotional acceptance and trait rumination would each interact with experimental condition. More specifically, it was predicted that the experimental effects hypothesized above would be enhanced for participants who are low in trait emotional acceptance as well as for those who are high on trait rumination. In other words, high ruminators and low emotional acceptors will show the biggest differences in recovery within the processing groups.

Hypothesis 4: Interaction between Processing Condition and Trait Emotional Acceptance

The fourth hypothesis addresses participants' recovery from a negative mood in each condition, based on their trait tendency to be accepting of emotions. The emotional processing condition (*Acceptance*, *Evaluation*, and *Control*) was expected to interact significantly with the trait measure. It was hypothesized that at the end of the study, participants who have a lower trait tendency to accept their emotions without judgment would be most affected by the experimental manipulation. They would have lower heart rate, lower skin conductance, higher skin temperature, higher self-reported positive affect, lower self-reported negative affect, less RAT related words answered correctly, and slower reaction times to the correctly answered RAT related words in the *Acceptance* processing condition than in the *Control* and *Evaluation* conditions, but would have higher heart rate, higher skin conductance, lower temperature, low self-reported positive affect, higher self-reported negative affect, more RAT related words answered correctly, and faster reaction times to the correctly answered RAT related words in the *Evaluation* condition compared to the *Acceptance* and *Control* groups. These differences would not be as pronounced as trait emotional acceptance increased.

In order to test this hypothesis, seven univariate regression analyses were conducted. The predictor variables in all of these analyses were emotional processing condition and Accept Without Judgment scores from the KIMS and their interaction. The criterion measure for three of these regression analyses was one of the physiological arousal measures (heart rate, skin conductance, skin temperature, respectively) at the final measurement phase (Sitting 2), with the corresponding baseline and RAT feedback physiological measurements used as covariates. The criterion measures for two of the

regression analyses were self-reported positive affect and self-reported negative affect at the fourth measurement phase. For these analyses, the baseline and second measure of positive or negative affect was used as a covariate. The criterion measures for two of the regression analyses were the number of correctly answered RAT related words (with number of correctly answered neutral words entered as a covariate), and the reaction time to correctly answered RAT related words (with reaction time to correctly answered neutral words entered as a covariate), respectively.

Heart Rate. The regression analysis for which the criterion variable was heart rate at the final measurement phase (Sitting 2), with baseline and RAT feedback heart rate used as covariates, resulted in an adjusted R^2 = -.02 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of heart rate at the Sitting 2 phase, using baseline and RAT feedback heart rate as covariates [Beta = -.56, SE = .20, t(94) = -1.04, p = .30].

Skin Conductance. The regression analysis for which the criterion variable was skin conductance at the Sitting 2 phase, with baseline and RAT feedback skin conductance used as covariates, resulted in an adjusted R^2 = .90 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of skin conductance at Sitting 2, using baseline and RAT feedback skin conductance as covariates [Beta = .04, SE = .01, t(94) = .26, p = .80].

Skin Temperature. The regression analysis for which the criterion variable skin temperature at the Sitting 2 phase, with baseline and RAT feedback skin temperature

used as covariates, resulted in an adjusted R^2 = .37 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of skin temperature at Sitting 2, using baseline and RAT feedback skin temperature as covariates [Beta = .34, SE = .04, t(94) = .80, p = .43].

Self-Reported Positive Affect. The regression analysis for which the criterion variable was self-reported positive affect at Time 4, using baseline and Time 2 positive affect as covariates, resulted in an adjusted R^2 = .69 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of positive affect at Time 4, controlling for positive affect at baseline and Time 2 [Beta = .02, SE = .07, t(97) = .08, p = .94].

Self-Reported Negative Affect. The regression analysis for which the criterion variable was self-reported negative affect at Time 4 using baseline and Time 2 negative affect as covariates, resulted in an adjusted R^2 = .64 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for unique variance for the prediction of negative affect at Time 4, controlling for negative affect at baseline and Time 2 [Beta = -.85, SE = .04, t(97) = -2.69, p < .01]. In order to explore this interaction, the KIMS Accept Without Judgment scores were split at the median of 29, and the interaction of condition with high (above the median) versus low (below the median) trait emotional acceptance was statistically significant, F(2,95) = 4.23, p = .02. Looking at the effects separately for high and low trait emotional acceptance groups, there were significant differences between emotional processing conditions for the low trait emotional acceptance group [F(2,46) = 5.95, p < .01] but not

for the high trait emotional acceptance group [F(2,47) = .82, p = .45. Post hoc contrasts showed that, for low emotional acceptors, the *Acceptance* group reported significantly lower negative affect at the end of the study than the *Control* group when controlling for baseline and post mood induction negative affect [F(1,46) = 9.32, $p < .01$]. In addition, the *Evaluation* group reported significantly lower negative affect at the end of the study than the *Control* group [F(1,46) = 6.09, p = .02]. Low trait emotional acceptance participants did not differ significantly between the *Acceptance* and *Evaluation* groups [F < 1]. A graph of high and low trait emotional acceptance participants' negative affect at Time 4 for each emotional processing condition is presented in Appendix MM.

Correct RAT Related Words. The regression analysis for which the criterion variable was number of correctly answered RAT related words, using number of correctly answered neutral words as a covariate, resulted in an adjusted R^2 = .10 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of the number of RAT related words answered correctly, using number of neutral words answered correctly as a covariate [Beta = .21, SE = .03, t(98) = .44, p = .67].

Reaction Time for Correct RAT Related Words. The regression analysis for which the criterion variable was the reaction time to correctly answered RAT related words, with reaction time to correctly answered neutral words as a covariate, resulted in an adjusted R^2 = .58 for the full model. The interaction between emotional processing condition and trait emotional acceptance accounted for no unique variance for the prediction of reaction time to correctly answered RAT related words, using reaction time

to correctly answered neutral words as a covariate [Beta = -.54, SE = 1.80, t(97) = -1.58, p = .12].

Hypothesis 5: Interaction between Processing Condition and Trait Rumination

The fifth hypothesis addressed participants' recovery from negative mood in each condition, based on their trait tendency to ruminate, and exactly parallels Hypothesis 4. The emotional processing condition (*Acceptance*, *Evaluation*, and *Control*) was expected to interact significantly with the trait measure of rumination. Due to the omission of the RRS from the online survey, the Rumination subscale of the LESS was the trait measure of rumination used in these analyses. It was hypothesized that at the end of the study, participants who had a higher trait tendency to ruminate would be most affected by the experimental manipulation. They would have lower heart rate, lower skin conductance, higher skin temperature, higher self-reported positive affect, lower self-reported negative affect, less RAT related words answered correctly, and slower reaction times to the correctly answered RAT related words in the *Acceptance* processing condition than in the *Control* and *Evaluation* conditions, but will have higher heart rate, higher skin conductance, lower temperature, low self-reported positive affect, higher self-reported negative affect, more RAT related words answered correctly, and faster reaction times to the correctly answered RAT related words in the *Evaluation* condition compared to the *Acceptance* and *Control* groups. These differences will not be as pronounced as trait rumination decreases.

In order to test this hypothesis, seven univariate regression analyses were conducted. The predictor variables in all of these analyses were emotional processing

condition and LESS Rumination score and their interaction. The criterion measure for three of these regression analyses was one of the physiological arousal measures (heart rate, skin conductance, skin temperature, respectively) at the final measurement phase (Sitting 2), with the corresponding baseline and RAT feedback physiological measurements used as covariates. The criterion measures for two of the regression analyses were self-reported positive affect and self-reported negative affect at the fourth measurement phase. For these analyses, the baseline and second measure of positive or negative affect were used as covariates. The criterion measures for two of the regression analyses were number of correctly answered RAT related words (with number of correctly answered neutral words as a covariate), and reaction time to correctly answered RAT related words (with reaction time to correctly answered neutral words as a covariate), respectively.

Heart Rate. The regression analysis for which the criterion variable was heart rate at the Sitting 2 phase, with baseline and RAT feedback heart rate used as covariates, resulted in an adjusted $R^2 = .01$ for the full model. The interaction between emotional processing condition and trait rumination accounted for unique variance for the prediction of heart rate at Sitting 2, using baseline and RAT feedback heart rate as covariates [Beta = 1.01, SE = .31, t(94) = 2.11, $p = .04$]. In order to explore this interaction, the LESS Rumination scores were split at the median of 18, and the interaction of condition with high (above the median) versus low (below the median) trait rumination showed a trend toward significance, F(2,92) = 2.21, $p = .12$. Looking at the effects separately for high and low trait rumination groups, there were marginally

significant differences between emotional processing conditions for the high trait rumination group [F(2,39) = 2.39, p = .11] but not for the low trait rumination group [F(2,51) = .34, p = .72.] Post hoc contrasts showed that, for high ruminators, the *Acceptance* group had significantly lower heart rate at the end of the study than the *Control* group when controlling for baseline and post mood induction heart rate [F(1,39) = 4.78, p = .04]. The *Evaluation* group did not differ significantly from the *Acceptance* group [F(1,39) = 1.95, p = .17] or the *Control* group [F < 1]. A graph of high and low trait rumination participants' heart rate at Time 4 for each emotional processing condition is presented in Appendix NN.

Skin Conductance. The regression analysis for which the criterion variable was skin conductance at the Sitting 2 phase, with baseline and RAT feedback skin conductance used as covariates, resulted in an adjusted R^2 = .90 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of skin conductance at Sitting 2, using baseline and RAT feedback skin conductance as covariates [Beta = .10, SE = .02, t(94) = .63, p = .53].

Skin Temperature. The regression analysis for which the criterion variable was skin temperature at the Sitting 2 phase, with baseline and RAT feedback skin temperature used as covariates, resulted in an adjusted R^2 = .37 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of skin temperature at Sitting 2, using baseline and RAT feedback skin temperature as covariates [Beta = -.29, SE = .06, t(94) = -.76, p = .45].

Self-Reported Positive Affect. The regression analysis for which the criterion variable was self-reported positive affect at Time 4, using baseline and Time 2 positive affect as covariates, resulted in an adjusted R^2 = .69 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of positive affect at Time 4, controlling for positive affect at baseline and Time 2 [Beta = .12, SE = .11, t(97) = .44, p = .66].

Self-Reported Negative Affect. The regression analysis for which the criterion variable was self-reported negative affect at Time 4, using baseline and Time 2 negative affect as covariates, resulted in an adjusted R^2 = .61 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of negative affect at Time 4, controlling for negative affect at baseline and Time 2 [Beta = .25, SE = .07, t(97) = .82, p = .42].

Correct RAT Related Words. The regression analysis for which the criterion variable was the number of correctly answered RAT related words, with number of correctly answered neutral words as a covariate, resulted in an adjusted R^2 = .06 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of the number of RAT related words answered correctly, using number of neutral words answered correctly as a covariate [Beta = -.62, SE = .05, t(98) = -1.33, p = .19].

Reaction Time for Correct RAT Related Words. The regression analysis for which the criterion variable was the reaction time to correctly answered RAT related words, with reaction time to correctly answered neutral words as a covariate, resulted in

an adjusted R^2 = .56 for the full model. The interaction between emotional processing condition and trait rumination accounted for no unique variance for the prediction of the reaction time to RAT related words answered correctly, using reaction time to neutral words answered correctly as a covariate [Beta = .18, SE = 2.91, t(97) = .57, p = .57].

Chapter Five: Discussion

The goal of the current study was to investigate the role of acceptance in emotional recovery from a distressing event. It was hypothesized that encouraging participants to process their emotions in an accepting manner would help them recover from a distressing event more quickly than participants not given acceptance instructions or those given instructions to evaluate and change their emotional experiences. Further, it was expected that control participants would recover more quickly from the distressing event than participants instructed to evaluate and change their emotional experience. In addition, the study investigated whether effects of the assigned emotional processing condition would be greatest for participants with low trait emotional acceptance or high trait rumination.

The first three hypotheses predicted that the emotional processing manipulation would affect participants' emotional recovery (as defined by return to baseline measures of heart rate, skin conductance, skin temperature, positive mood, negative mood, and accessibility of failure-related words) from failure feedback. Essentially, an attempt was made to track the progress of participants' emotional recovery in three different response systems: Physiological response, self-reported mood, and behaviorally demonstrated rumination.

Differences between the emotional processing groups were found on only two of these six measures: negative affect as measured by the PANAS and rumination as measured by reaction time to correctly answered RAT related words. As predicted, the *Acceptance* group had significantly lower self-reported negative affect than the *Control*

group at the final measurement period. Contrary to prediction, however, the *Acceptance* group did not do significantly better than the *Evaluation* group. Also, significant results between conditions were found for rumination, but the effect was opposite to what was expected. The *Acceptance* group correctly responded to RAT related words more quickly than the *Control* group, and marginally more quickly than the *Evaluation* group. There were no significant differences between *Evaluation* and *Control* groups on reaction time to RAT related words. Before considering these results in depth, the null results on each of the other dependent variables will be summarized and briefly considered.

No significant condition effects were found for any of the physiological measures used in the study: heart rate, skin temperature, and skin conductance. In the case of skin conductance, data from the present study support that this measure was a valid indicator of emotional distress: Skin conductance measured at the different phases showed high intercorrelations, and skin conductance increased as expected between baseline and RAT failure feedback. In the case of heart rate, there is reason to question the validity of this measure: Heart rate measurements at the different phases were mostly uncorrelated, indicating low reliability. In addition, there was no significant increase from baseline to RAT feedback to indicate an effect of the feedback on heart rate. These measurement issues make the results for heart rate difficult to interpret. Also of note, the room participants were in tested in was not sound proof, and on many occasions during testing, noises in the hallway and accidental interference from people looking for other studies may have affected participant's heart rate. In addition, simple movements or bodily

functions, such as coughing or sneezing, may have contributed to noise in the heart rate measure.

In the case of the skin temperature measure, high intercorrelations between measurements taken on this variable at the different study phases indicates that it was a reliable measure, but a significant difference between groups on this variable was found at baseline. Despite random assignment to conditions, the *Acceptance* condition began the study with significantly lower skin temperature than the *Control* condition, also making it difficult to determine significant changes on this variable over time. Also, temperature changes after failure feedback increased rather than decreased, as had initially been expected. While this increase might suggest that dysphoria was not induced, increases in temperature are consistent with other emotions, such as anger (Levenson, et al., 1990; Stemmler, 1989), or shame or embarrassment (Shearn et al., 1990). Overall, there seemed to be a trend in temperature increasing throughout the study, which coincides with experimenter and participant reports that the room temperature felt warm during testing. It is possible that this increase in temperature overall was responsible for the increase in temperature after RAT feedback, and could have masked any true effects due to experimental manipulations at later points in the study.

Within the domain of self-reported mood, positive affect did not show significant condition effects, though means were in the expected direction (see Appendix II). Available data from the study give no reason to question the validity of this measure. Positive affect measures at each administration of the PANAS were highly

intercorrelated, and positive affect decreased from baseline to the second measurement point (after the failure feedback), as expected.

Finally, one of the measures of rumination, the number of correctly solved incomplete words related to the RAT failure task, yielded no significant condition effects. In retrospect, it is not too surprising that group differences were not found on the number of correct responses. This index of rumination was not a sensitive measure, as most of the items were either extremely high or low in difficulty. There were few items in the moderate range of difficulty, which would be where group differences would be likely to emerge. Approximately 50 percent of the words were answered correctly by 75 percent or more of participants, while approximately 30 percent of the words were answered incorrectly by 75 percent or more of participants. However, there were significant differences between processing conditions for rumination as measured by reaction time to correctly answered RAT related words. The *Acceptance* group correctly solved RAT related words more quickly than both the *Evaluation* and *Control* groups, who did not significantly differ from each other.

This difference between groups on the rumination reaction time measure directly contradicts the predicted effects. Participants in the *Acceptance* group were predicted to show less rumination than *Controls* and the *Evaluation* group, meaning that they were expected to respond more slowly to correctly answered RAT related words that the other two groups. However, results show that *Acceptance* participants responded significantly faster than participants in the *Control* group, and marginally significantly faster than participants in the *Evaluation* group, suggesting that they were ruminating more.

It is possible that the Word Recognition task is not measuring rumination, per se. It does seem to be measuring the accessibility of RAT related words, suggesting that RAT related words were cognitively more easily accessible for the *Acceptance* participants than participants in the other conditions. This result may mean that *Acceptance* participants were directly focusing on the experience of failure and their emotions that resulted from this experience more than other participants.

It is interesting that at the end of the study, *Acceptance* participants had words related to the failure experience more readily accessible than *Controls*, but reported less negative affect. While it was initially predicted that both thoughts about the failure experience and negative affect would decrease over time for the *Acceptance* group compared to the other two groups, the fact that the *Acceptance* participants thought more about the experience while feeling less negative about it than *Controls* is not as surprising as it first appears. This result could indicate that *Acceptance* participants were able to direct their attention to the failure experience and keep the experience in mind without being distressed by it. This interpretation supports the link between processing emotions in an accepting manner and beneficial mood effects and, in retrospect, is exactly what the *Acceptance* manipulation was intended to do.

When comparing the *Acceptance* and *Evaluation* conditions results, there is some evidence that, contrary to prediction, the *Evaluation* instructions were also somewhat effective. The *Acceptance* condition did not differ from the *Evaluation* condition on negative mood, but did show marginally more accessibility to failure related words than the *Evaluation* condition.

While the previous interpretations are interesting possibilities to consider, it is also important to discuss alternative interpretations of these significant results in light of study limitations. First, it is possible that the difference between the *Acceptance* and *Control* groups may have been due to unanticipated effects of the *Control* condition. The *Control* condition may have been more frustrating than the other conditions, resulting in the higher self-reported negative mood for the *Control* group than the *Acceptance* group by then end of the study. Since the *Control* condition shows evidence of being more irritating than the other conditions, participants in the *Control* group might not have been actually handling the experience in their usual way, but reacting to a more stressful environment than to which the other groups were exposed. This would mean that encouraging participants to accept their emotional experience after a failure experience was not necessarily more beneficial than allowing participants to handle the experience in their normal fashion. It follows that the thoughts of *Control* participants could have been focused more on the experimental procedures that were bothering them, which could have interfered with rumination about the failure experience.

Another possible interpretation of the group differences in mood and rumination could be that *Acceptance* participants may have been truly ruminating more than participants in the other conditions, which intended interpretation of faster reaction time scores to failure related words. With evidence in the literature that rumination is related to negative emotional health outcomes, one might wonder how *Acceptance* participants could be truly ruminating more than the other groups, but reporting similar mood to the *Evaluation* group, and significantly less negative mood than the *Control* group. Since the

content of the manipulations differed, it is possible that the emotion presentation and writing in the *Acceptance* group caused those participants to endorse less negative mood than the *Control* group as a result of demand characteristics, even if they did not actually feel less negative mood.

Predictions of Trait by Processing Group Effects

The fourth and fifth hypotheses predicted that emotional processing condition would interact with trait measures of rumination and emotional acceptance, respectively. It was predicted that participants' emotional recovery (as measured by heart rate, skin conductance, skin temperature, positive mood, negative mood, and accessibility of failure-related words) from failure feedback would be different, depending on participants' level of the trait measured and the processing condition to which they were assigned. Contrary to predictions, results showed no significant interaction between the emotional processing group and trait measures on most of the dependent variables assessed during the study.

There was, however, a significant interaction between processing condition and trait emotional acceptance for negative affect at the end of the study, as well as a significant interaction between condition and trait rumination for heart rate at the end of the study. As predicted, there was some evidence that the emotional processing conditions affected recovery from failure feedback differentially depending upon participants' trait tendency to ruminate or trait tendency to accept their emotions without judgment.

For participants with low trait emotional acceptance, both accepting emotions without judgment and analyzing/changing emotions resulted in less negative affect than handling emotions in the usual manner. Contrary to prediction, however, these participants did not have less negative affect in the *Acceptance* condition than in the *Evaluation* condition at the end of the study. For participants with high trait rumination, learning to accept emotions without judgment after a failure experience appeared to result in lower arousal as measured by heart rate than handling their emotions in their usual manner. The problems with the heart rate measure in the current study, as well as in other studies, suggests that this result should be interpreted with caution, however.

Understanding the Null Effects

Most of the predictions for the current study were not supported. The lack of significant differences found between processing conditions might suggest that, in general, learning to process negative emotions in an accepting manner is not more beneficial to recovery from a failure experience than evaluating and trying to change the negative emotions or handling emotions in the usual manner. However, the significant interactions found between trait measures and processing conditions for the variables of negative affect and heart rate might suggest that learning to be accepting of emotional experience is helpful, but only to the most vulnerable populations, such as people high in trait rumination or low in trait emotional acceptance. It is also possible that various components of the study design and setting might have contributed to the null effects.

Measurement Issues

The measures used to assess recovery from failure feedback in the study were a combination of self-report measures, physiological measures, and behavioral measures. Descriptive data on the physiological measures provides evidence that one of these measures, heart rate, was not a stable measure, and therefore a difficult one to use to assess recovery. This is consistent with previous research, that notes that heart rate is variable, and is susceptible to external factors and individual differences (Arriaga et al., 2006; Bauer, 1998; Suckfüll, 2000) that may interfere with the ability to use it to detect changes in emotional arousal over time. In addition, the measure of skin temperature may have been influenced by the temperature in the room, or of the participant's hand, which was strapped down in an effort to reduce movement that might interfere with heart rate measurements. It is possible, too, that the environmentally induced skin temperature ratings may have interfered with skin conductance ratings, since many participants complained of the heat from their hand causing extra perspiration.

It is important to note that the difficulty using physiological measures is not unique to the current study. While a more controlled experimental setting may have resulted in better physiological readings, research has demonstrated difficulty using of physiological measures in general. While they are an important way to supplement self-report measures of mood, they are often unreliable and don't always correlate well with self-report (Coventry & Constable, 1999; Wofford, 2001).

The self-report measure of mood in the current study was the PANAS. Self-report measures are strongly susceptible to demand characteristics, in which participants might endorse items in the way they believe they are expected, regardless of the way they truly

feel. In addition, while this scale has subscales measuring both overall positive affect and overall negative affect, the different emotional states within each are not differentiated. It is possible that a measure of specific emotions might have been more sensitive to experimental effects.

The behavioral measure of rumination in the current study was designed to measure rumination by determining whether and how quickly participants recognized words related to the failure experience when some of their letters were missing, controlling for whether and how quickly they recognized neutral words with letters missing. This measure was intended to assess rumination without demand characteristics inherent in self-report. The task used in the current study is a new measure, and is not a recognized measure for assessing the construct of interest. The task is a complex task, and while pilot studies were conducted to guide its construction so that it would accurately assess rumination, it is probable that more piloting is required to be sure it accurately assesses rumination about the specific task in this study.

The RAT related and neutral words for the task were selected based on a small pilot study in which participants were told to imagine doing poorly on a test of problem solving, and then rated the extent to which each of the words listed would remind them of the study. Perhaps a more effective way to select words for the study would have been to expose participants to the actual RAT administration, rather than have them imagine the experience; however, the latter procedure was selected in an effort to avoid unnecessarily exposing participants to a negative mood induction. Also, the way the incomplete words were presented might have affected how easy or difficult they were to solve. The number

of missing letters, location of missing letters, the length of the word, and whether the missing letters were vowels or consonants are all variables to consider when deciding on the stimuli to which participants will be responding. In addition, while the decision to omit a self-report measure of rumination in the current study was made in an effort to avoid demand characteristics, it will be important in future uses of the Word Recognition task to assess its relationship to valid and reliable measures of rumination already in use.

The failure to find an interaction between emotional processing condition and trait rumination for most dependent variables in the study may also be the result of the measures used. The Rumination subscale of the LESS is fairly untested, and had low reliability in this study. The one significant interaction between condition and trait rumination was on the heart rate measure, but due to the large number of predictions tested, combined with the previously mentioned problems with heart rate, this result must be interpreted with caution.

Manipulation of Emotional Processing

The lack of significant differences between conditions on physiological measures and self-reported positive affect may have been the result of problems with the way emotional processing was manipulated in the current study. One possibility is that the manipulation performed as intended but was just not very powerful, hence failing to produce effects on most of the dependent measures used. Participants viewed presentations that encouraged different methods of processing, and then applied these concepts in writing. This procedure enabled standardization of presentation, and thus tight experimental control. It is possible that this relatively impersonal presentation of

processing instructions simply had little or no impact on participants. It may have been more effective to utilize an interactive instructional period where participants could ask questions and make clarifications.

Also, the writing prompts were borrowed from a study of self-compassion, but were modified to encourage either emotional acceptance or emotional evaluation and change, specifically. More piloting may be needed to ensure the prompts address the concepts of emotional acceptance and emotional evaluation as intended. Since the study of emotional acceptance is fairly new, however, there are no well-established measures against which new interventions can be assessed, making it difficult to be sure that interventions, such as the presentation and writing prompts used in this study, are adequately influencing emotional acceptance. In addition, the absence of interventions proven to influence emotional acceptance means that it will be difficult to validate measures of emotional acceptance.

Also, as mentioned previously, after the failure feedback the *Control* group may have had an experience that differed from the experimental groups in ways that were unintended. *Control* participants viewed a presentation on emotions using excerpts from an impersonal, academic discussion of emotion theory from a psychobiological perspective. This presentation was likely to have been slightly disjointed and uninteresting, causing or exacerbating experimentally induced negative feelings. In addition, the writing portion of the study was repetitive for *Control* participants, as they had to write in response to three very similar, open-ended prompts for a significant amount of time. This appeared to seem pointless and somewhat irritating to some

participants as judged by comments a number of participants made in their writings and during the debriefing. While probing participants after the study, several control participants incorrectly guessed that they were being asked to repeatedly write about nothing specific in effort to elicit a negative reaction from them, and complained about not understanding the point of the writing. Therefore, the mood effects of the failure feedback may have slowly worn off over the course of the study for the experimental participants, while the irritating nature of the *Control* procedure exacerbated these negative mood effects.

In addition, although the *Control* group was intended to be a condition where emotional processing was not manipulated, there was some difficulty in achieving this without sacrificing experimental control. It is unlikely that all participants in the *Control* condition, if allowed to truly handle the failure feedback in their usual manner, would have chosen to write during the time specified in the study. *Control* participants were required to engage in activities that were similar to experimental participants so as to control for other activities that may have influenced their mood; however, the writing in which *Control* participants engaged may have unintentionally manipulated their mood, or interfered with their normal form of emotional processing.

Experimental Setting and Length

All in-person study sessions were held in the same location, in a small room near a hallway of entrance level floor of a classroom building at the University of Texas. Due to its location, there were times that noise from the hallway from classes being let out or from participants in other studies in adjacent rooms filtered into the room, possibly

disrupting participants' processing, changing their emotions, or influencing their physiological measures. In addition, the room at times became warm, as reported by participants as well as experimenters, which may have unexpected influence on the measurements assessed during the study.

Another aspect of study design that may have resulted in the non-significant effects between conditions might be the length of the study. While writing in response to prompts encouraging various forms of emotional processing has been shown to result in differences between groups in previous studies (Hunt, 1998; Watson, 2004), it is likely that the amount of processing time in the current study did not allow for the different effects to surface. Participants had approximately a half hour of processing time from the moment the presentation was shown until the last physiological and self-report measures were taken. It is possible that effects of the processing conditions might have surfaced later. Watson (2004) and Hunt (1998) did not find differences in the effects of their writing conditions until participants had written twice in response to the same prompts, which occurred several hours after the mood induction. The decision on the length of the study was based on trying to balance the need for time for processing differences between groups to emerge with the need to retain participants and minimize levels of irritation due to study length. In the future it might be more effective to have the study take place over a two-day period, if participant retention and fatigue can be controlled.

RAT Failure Feedback

Effectiveness of Mood Induction. While performance deception has been used effectively to induce negative mood in college students (McFarlin and Blascovich, 1984;

Watson, 2004; Hunt 1998), it is possible that in the current study the manipulation resulted in different emotional effects than intended, or was less effective than in these other studies. While skin conductance measures revealed predicted changes as a result of the failure feedback, temperature showed opposite effects than expected, though this does not necessarily mean that the temperature readings were invalid. An increase in temperature has been shown to be indicative of anger (Levenson, Ekman, & Friesen, 1990; Stemmler, 1989), rather than dysphoria, so it is possible that participants were not feeling sad as a result of their failure experience, but feeling angry. In addition, skin temperature increases in conjunction with skin conductance increases have been found with emotions that elicited blushing (Shearn, Bergman, Hill, Abel, & Hinds, 1990). Both shame and embarrassment can cause blushing, and both are feasible emotions to experience in response to the failure feedback in the current study. Therefore, it is also possible that the increases in temperature and skin conductance reflected shame or embarrassment.

Additionally, it is possible that some element of the study design resulted in participants being suspicious of the RAT failure feedback, which might have decreased the saliency of the mood induction. Participants who reported suspicions about the task when probed at the end of the study were excluded, in an attempt to eliminate participants who would not be negatively affected by the experience. These participants often referenced the falsified norms on the answer sheet as triggering their suspicions, and perhaps in the future the norms should not be used, or they should be modified so as to not seem unrealistic. In addition, it is possible that all participants who were suspicious of

the validity of the task were not identified by the probe questions utilized, leaving participants in the study who were not truly negatively affected by the mood induction. However, the results of positive and negative self-reported mood in the control condition, as well as skin conductance and skin temperature readings, suggest that overall, the mood induction was successful.

Also important to note is that by probing in retrospect, it is possible that more participants reported being suspicious at the end of the study than actually were suspicious at the time of the feedback. In addition, participants who were doubtful of the validity of the test may still have been successfully induced into a dysphoric mood. It might be helpful in future studies to have a self-reported mood measure directly after the failure feedback, in order to be able to exclude participants who were not successfully induced into a negative mood. This procedure was followed in Hunt (1998) and Watkins (2004). The decision to omit a self-report measure immediately after mood induction was based on the belief that such a face valid measure might cue participants into the mood inducing intention of the RAT failure experience and neutralize any mood effects. Perhaps the use of a disguised mood measure directly after RAT feedback may be the most effective way to approach this problem in the future.

Strength of Mood Induction. It is also possible that the effects of the RAT failure feedback were not strong enough, so the negative mood that was induced did not last long enough to show differences in recovery based on emotional processing condition. The current study presented the RAT as a measure of problem solving ability. Although Watkins (2004) and McFarlin and Blascovich (1984) told participants that the RAT was a

measure of intelligence, the current study modified this procedure out of ethical concern for participants. It is possible that participants would have been more negatively affected by feedback that their IQ was lower than average. The current study attempted to balance the need for a mood induction that was powerful enough to have negative mood effects that were susceptible to effects of processing condition, with the ethical concern that such a manipulation might have resulted in effects that outlasted the length of the study and posed risk to participants' mental health.

On a related note, it was difficult to know how long the negative mood induced by the RAT might last, resulting in difficulty knowing when to take mood measurements to find effects. Therefore, the decision was made to take multiple self-reported mood measurements and look at particular physiological readings at specified points in the study, and it is not surprising that most of these measurement points did not show significant differences between groups.

Strengths of the Study

Despite various limitations to study design, there were a number of important strengths to the current study. First, the study used an experimental design to investigate the effects of emotional processing. Much of the research about emotional processing uses correlational designs to show relationships between emotional processing styles and outcomes (Nolen-Hoeksema, 2004; Nolen-Hoeksema, et al., 1999; Nolen-Hoeksema et al., 1993, Nolen-Hoeksema et al., 1994, Nolen-Hoeksema & Morrow, 1991). While demonstrating these relationships is important, the use of an experimental design, with random assignment of participants and manipulation of emotional processing condition,

allows researchers to investigate emotional processing style separate from confounding variables such as participant or situational characteristics.

Many steps were taken to heighten internal validity by maintaining high levels of experimental control. The researchers were initially blind to experimental condition, reducing the likelihood that participants' performance would be influenced by experimenter bias. In addition, all study sessions were conducted in the same experimental setting, decreasing the likelihood that setting variables might differentially affect participants in experimental conditions. Also, study procedures were standardized by having all researchers follow a well-practiced detailed script, which reduced the chance that different experiences within the study session might have differentially influenced participants in the study conditions. The three conditions were constructed in such a way that participants encountered almost identical procedures, with content of presentation and writing being the only factors that varied.

Next, the study utilized behavioral and physiological measures in addition to self-report, allowing for assessment of recovery from failure feedback that was not susceptible to demand characteristics. It will be important to continue to find ways of assessing constructs related to cognitive and emotional processes that are not susceptible to demand characteristics, which has been one of the biggest struggles in these field of study. The use of a behavioral measure of rumination, such as the Word Recognition task used in the current study, may prove to be an effective way to assess rumination in the future after additional piloting.

The study also experimentally induced negative mood in a manner that closely simulated a real-world failure experience, which would be expected to be particularly salient to the college participants in the current study. An alternative method of mood induction frequently used in studies involves having participants recall a past experience in which they felt the particular emotion of interest, such as that used by Ayuduck, Mischel, and Downey (2002). In contrast to this method, experimentally inducing negative mood by having all participants experience a failure experience allowed more experimental control. Participants experienced the same experience, for the same amount of time, and had equal amounts of time to process the experience. These factors are more difficult to control for when asking participants to recall past events in order to induce negative mood. Another method of mood induction frequently used in the emotion literature is the Velten Mood Induction Procedure (Velten, 1968), where participants read positive or negative emotional statements in the first person to induce either a positive or negative mood. This method of mood induction is more standardized than having participants recall past experiences, but has shown evidence of being subject to demand characteristics (Larsen & Sinnett, 1991). The current method of mood induction is less susceptible to demand characteristics because participants are not aware that the task is designed for failure, and the task itself does not involve discussion of emotions.

Importance of the Study

The current study attempted to show that differences in the way people process their emotions can affect their recovery from distressful experiences. Particularly, it was hypothesized that people who are influenced to process their emotions in an accepting

manner will recover from distressing experiences more quickly and ruminate less. The study attempted to isolate emotional acceptance in an attempt to identify it as a key variable in distinguishing between harmful self-focus on emotional experience like rumination, and helpful self-focus on emotional experience like emotional processing. Understanding the role of emotional acceptance on its own would be important to the larger bodies of research in mindfulness and self-compassion, both of which incorporate this concept along with other components that appear to be beneficial.

This is also an important area of research for therapeutic approaches to treating depression and preventing depressive relapse. If it can be demonstrated that people struggling with distressing experiences can be taught to process these experiences in a more accepting manner, and this results in faster recovery, it would follow that incorporating acceptance ideas into treatments for depression would be beneficial. Acceptance approaches could have the potential to help individuals handle their negative emotions more productively and this in turn might lead to decreased depression vulnerability.

Future Directions

Continued experimental investigation of the role of emotional acceptance in distinguishing between helpful versus harmful emotional processing is an important task for future research and is likely to make important contributions to theoretical understanding of mindfulness, self-compassion, depression, and rumination. In addition, such research is likely to have practical significance for the treatment and prevention of depression, and possibly other mood disorders. Of primary importance would be further

developing the processing manipulations to assure they effectively manipulate emotional processing in the manner in which they are intended. This might be accomplished by finding measures of concepts related to *Acceptance* and *Evaluation* and looking at the change in participants' scores on these measures before and after experiencing the manipulations. Also, developing a *Control* condition that is more naturalistic and does not allow the possible interpretation that it increased participant irritation would allow for accurate comparisons between these different emotional processing approaches and the way that participants naturally handle their emotions. In addition, conducting the study over a longer time period may allow the emergence of effects of the processing manipulations that could not be detected in the current study.

In addition, if reliable benefits to emotional acceptance were found in the university population, it would be important to study the effects in different populations to investigate to whom these benefits generalize. Since university student populations are not representative of the general public, it would make sense to study emotional acceptance in non-university students. It is possible that emotional acceptance might be differentially effective for different age groups, races, and genders, and clinical diagnoses.

It would also be interesting to study the effects of emotional acceptance on various emotions. For example, are people as likely to be judgmental of positive emotions as they are negative emotions? If so, is non-judgmental acceptance of positive emotions as beneficial to emotional health as non-judgmental acceptance of negative

emotions seems to be? Is learning to accept certain negative emotions, like sadness, more beneficial than learning to accept other negative emotions, like anger?

Finally, if teaching people to non-judgmentally accept their emotions proves beneficial to emotional recovery and/or prevention of debilitating mood episodes, it will also be important to determine if the benefits to this approach provides distinct advantages over established treatment approaches to depression. This could be studied by conducting studies that randomly assign participants to an acceptance treatment, or one of various treatment conditions, such as cognitive-behavioral, mindfulness-based cognitive therapy, interpersonal, or psychotropic medication.

Appendix A

RAT Items

Words on Card	Correct Answer
Bass-Complex-Sleep	Deep
Chamber-Staff-Box	Music
Desert-Ice-Spell	Dry
Base-Show-Dance	Ball
Inch-Deal-Peg	Square
Soap-Shoe-Tissue	Box
Blood-Music-Cheese	Blue
Skunk-Kings-Boiled	Cabbage
Jump-Kill-Bliss	Joy
Shopping-Washer-Picture	Window
Hot-Butterflies-Pump	Stomach
Bald-Screech-Emblem	Eagle
Room-Saturday-Salts	Bath
Widow-Bite-Monkey	Spider
Cherry-Time-Smell	Blossom

Appendix B

Acceptance Slide Content

The following slides provide information about emotional experience that represents the best understanding of experts in psychology. This segment of the study will take approximately 5 minutes. Emotions are crucial, not only to survival, but to maintaining relationships and bonds with others. Emotions are part of an instinctive system for processing information about our environments. For example, part of feeling anger is to experience a rush of hormones such as adrenaline that facilitates vigorous action and a rush of blood to the muscles, making it easier to initiate self-defense…. Sadness brings a drop in energy and metabolic processes, tear production, and constriction of throat muscles. A main function for sadness is to help adjust to a significant loss, such as a disappointment, or the death of someone close. Sometimes we are disturbed by our emotional reactions--we might believe that an emotion is not "appropriate" or is overly intense. For example, when we experience jealousy or intense sadness we may see it as a sign of weakness or dysfunction in ourselves . . .We may be ashamed or disturbed by our own reaction. But emotions such as sadness, and the physical signs of sadness (a lowering of energy level, urges to sob, tearing up) are simply physiological responses to events. All humans experience this. The impulses that come along with emotions are normal and will pass. You can notice your feelings and process what is disturbing you without acting on them. For example, you can notice the intense feelings of anger without "blowing up." And you can notice the powerful feelings of sadness without collapsing or giving up. When we turn our awareness toward our emotions without acting them out, we

typically find that emotions provide us with information that is important to our lives. Throughout the rest of this presentation, work to enhance awareness of any emotions and sensations you may feel. See if you can be curious about your feelings…Bring a type of attention to your emotions that is full of interest but that does not judge the experience as "good" or "bad." Use your awareness to experience any emotions you are feeling. Is there a place in your body where you experience the emotion most strongly or clearly? Try to maintain a full awareness of the feeling without looking at it through a filter of judgment. Are you tired, irritated, or bored right now? Are you feeling anxiety? Are you relaxed, alert, content, or joyful? You may have the impulse to distract yourself from these feelings or to be submerged in them. Instead . . . ask yourself: What does boredom (or irritation, or fatigue, or anxiety) feel like? Once you let go of the habitual interpretations (e.g. "I need to change this feeling"), you may notice that the experience of that feeling changes. When we can recognize an emotion clearly and openly, our relationship with it changes. We no longer have to resist it or cling to it. We can instead learn to accept it with a clear, nonreactive awareness. This is the end of the slide presentation. Please let the researcher know you are ready to continue.

Appendix C

Evaluation Slides Content

The following slides provide information about emotional experience that represents the best understanding of experts in psychology. This segment of the study will take approximately 5 minutes. Emotions are subjective experiences and objective behavior patterns accompanied by arousal of physiological systems in the body. For example, experiencing anger can feel uncomfortable and overwhelming at certain times - such as in front of people you don't know well, or in a professional setting. Sadness can be distracting in certain situations – such as while trying to prepare for an exam or in the presence of someone whom you admire. Emotions can be disturbing — especially ones that seem "inappropriate" or overly intense. Often, once an emotion is experienced, it is difficult to avoid acting on it. But behaviors can be changed if you change the way you think about the situation, therefore changing your emotions. People often report that they can function better if they can avoid feeling angry or sad. For example, you can recognize thoughts that preceded intense feelings of anger and then analyze the situation rationally. And you can evaluate the thoughts that lead to feelings of sadness to prevent yourself from giving into it. If you think: "Why am I feeling this way?" and "What would be a more productive emotion?" you may be able to control your reaction and decrease your negative feelings. Sometimes emotions indicate that you are going about something the wrong way. If you think hard about what might be wrong, you may be able to fix it and get rid of the uncomfortable feeling. Throughout the rest of this presentation, work to analyze any emotions and sensations you may experience. Think about where these

emotions come from, why you are experiencing them this way, and what they say about you as a person… Try to determine whether the emotional experience is good or bad (useful or harmful). When negative feelings come into your mind, investigate them and try to change them if you can. As you evaluate your emotions, focus on your thoughts about them, determining if they are useful. As you identify the possible causes of these feelings, decide how logical or true these thoughts are, trying to change them to be more accurate or helpful. Are you feeling any negative emotions (fatigue, irritation, boredom, sadness, anxiety) right now? If you feel any of these emotions, you may want to focus on trying to figure them out. Ask yourself: Why do I feel this way? What does it mean that I have these feelings? What will happen if I continue to feel this way? Try to analyze yourself, your thoughts, and your emotions. Work to gain a better understanding of yourself, to learn ways you can prevent these negative feelings in the future. This is the end of the slide presentation. Please let the researcher know you are ready to continue.

Appendix D

Control Slides Content

The following slides provide information about emotional experience that represents the best understanding of experts in psychology. This segment of the study will take approximately 5 minutes. The American philosopher/psychologist William James (1842-1910) contemplated what people's feelings might be like if they were somehow separated from their bodies. For James, the body is central to the generation and experience of feelings. The body, for Jamesians, possesses a complex and articulate language, and without a body, there would be no emotion, no feelings. Whereas Darwin, with his focus on the evolutionary functions of feelings, was concerned primarily with emotional expression - visible signs of feelings, James was concerned primarily with emotional experience, or the way individuals experience their feelings. In order to understand James' theory of emotion, we must first have a sense of what he considered the wrong way to think about feelings. We do not, in his view, first perceive some emotion-eliciting stimulus and then "express" it. Rather, in order to experience an emotion or feeling, an individual first must experience certain bodily changes. These bodily changes are assumed to be initiated directly by the perception of the emotion-eliciting stimulus.

In James' own words, "bodily changes follow directly the PERCEPTION of the exciting fact, and feeling of the same changes as they occur IS the emotion . . . the more rational statement is that people feel sorry because they cry, angry because they strike, afraid because they tremble…and not that people cry, strike, or tremble, because they are sorry, angry, or fearful, as the case may be" (James, 1884, pp. 189-190). James' insistence that

an emotion is felt only to the extent to which it is expressed in some way can be seen as a crucial link between his theory and Darwin's. James, indeed, was a strong proponent of Darwin's evolutionary theory. And James' brand of functionalism can be seen as an application to psychological phenomena of the idea of adaptation by natural selection. "[T]he nervous system of every living thing is but a bundle of predispositions to react in particular ways upon the contact of particular features of the environment" (James, 1884, p.190). The physiology of emotions, for James, consists of just such predispositions to respond to the environment in particular situations. Thus, like Darwin, James believed that there was an evolutionary reason why certain physiology accompanies emotion. "The labours of Darwin and his successors are only just beginning to reveal the way in which each [animal] brings the signature of its special relations stamped on its nervous system with it upon every scene" (James, 1884, pp. 190-191). This is a feature of James' theory that is not appreciated by many psychologists, and is rarely spoken of in discussions of his theory of emotions. Notwithstanding, it allows us to see an important connection between the theory of expression of Darwin and the theory of feeling of James. James' contribution was to attempt to construct a framework for understanding the place of feelings in an evolutionary theory of emotions. This is the end of the slide presentation. Please let the researcher know you are ready to continue.

Appendix E

Acceptance Writing Prompts

When responding to the following topics, don't worry about spelling or punctuation, and feel free to use complete or incomplete sentences.

1. Notice the emotions that you are currently experiencing and write about them. What bodily sensations do you notice as you experience these emotions?

2. As if you were writing a letter to friend, encourage yourself to accept the emotions you are experiencing, reminding yourself that your feelings are completely normal and nothing to be ashamed of or alarmed by.

Appendix F

Evaluation Writing Prompts

When responding to the following topics, don't worry about spelling or punctuation, and feel free to use complete or incomplete sentences.

1. Analyze the feelings that you have right now. Why are you feeling this way? How might any of these emotions be unhelpful in your current situation?

2. As if you are a teacher writing a letter to a student, write about which of your emotions should be discouraged and why these feelings might get in your way and be counterproductive.

Appendix G

Control Writing Prompts

When responding to the following topics, don't worry about spelling or punctuation, and feel free to use complete or incomplete sentences.

1. Write about anything that you want to write about. This can include lists, notes, or stream of consciousness. There is no right or wrong topic to write about.

2. Continue to write about whatever you want to write about at this time. Again, the writing can be formal or informal, bullet points or paragraph form, and can be about any topic.

Appendix H

Beck Inventory

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

1. 0 I do not feel sad.
   1 I feel sad.
   2 I am sad all the time and I can't snap out of it.
   3 I am so sad or unhappy that I can't stand it.

2. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel that the future is hopeless and that things
   cannot improve.

3. 0 I do not feel like a failure.
   1 I feel I have failed more than the average person.
   2 As I look back on my life, all I can see is a lot of failures.
   3 I feel I am a complete failure as a person.

4. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I used to.
   2 I don't get real satisfaction out of anything anymore.
   3 I am dissatisfied or bored with everything.

5. 0 I don't feel particularly guilty.
   1 I feel guilty a good part of the time.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. 0 I don't feel I am being punished.
   1 I feel I may be punished.
   2 I expect to be punished.
   3 I feel I am being punished.

7. 0 I don't feel disappointed in myself.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.

8. 0 I don't feel I am any worse than anybody else.
   1 I am critical of myself for my weaknesses or mistakes.

2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9. 0 I do not have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. 0 I don't cry anymore than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't even though I want to.

11. 0 I am no more irritated now than I ever am.
1 I get annoyed or irritated more easily than I used to.
2 I feel irritated all the time now.
3 I don't get irritated at all by the things that used to irritate me.

12. 0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.

13. 0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.

14. 0 I don't feel I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.

15. 0 I can work about as well as usual.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16. 0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17. 0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19. 0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds.
2 I have lost more than 10 pounds.
3 I have lost more than 15 pounds.

If purposely trying to lose weight by eating less, check here ___.

20. 0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems, that I cannot think about anything else.

21. 0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix I

Positive and Negative Affect Schedule

This scale consists of a number of different words that describe different feelings and emotions. Read each item and then circle the appropriate number next to the word. Indicate to what extent you feel this way at the present moment.

	very slightly/ not at all	a little	moderately	quite a bit	extremely
interested	1	2	3	4	5
distressed	1	2	3	4	5
excited	1	2	3	4	5
upset	1	2	3	4	5
strong	1	2	3	4	5
guilty	1	2	3	4	5
scared	1	2	3	4	5
hostile	1	2	3	4	5
enthusiastic	1	2	3	4	5
proud	1	2	3	4	5
irritable	1	2	3	4	5
alert	1	2	3	4	5
ashamed	1	2	3	4	5
inspired	1	2	3	4	5
nervous	1	2	3	4	5
determined	1	2	3	4	5
attentive	1	2	3	4	5
jittery	1	2	3	4	5
active	1	2	3	4	5
afraid	1	2	3	4	5

Appendix J

Kentucky Inventory of Mindfulness Skills – Accept Without Judgment Scale

Please read the following items and circle the number that best reflects how true each statement is for you.

	Never or very rarely true	Seldom true	Sometimes true	Often true	Almost always or always true
1. I criticize myself for having irrational or inappropriate emotions.	1	2	3	4	5
2. I tend to evaluate whether my perceptions are right or wrong.	1	2	3	4	5
3. I tell myself that I shouldn't be feeling the way I'm feeling.	1	2	3	4	5
4. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1	2	3	4	5
5. I make judgments about whether my thoughts are good or bad.	1	2	3	4	5
6. I tend to make judgments about how worthwhile or worthless my experiences are.	1	2	3	4	5
7. I tell myself that I shouldn't be thinking the way I'm thinking.	1	2	3	4	5
8. I think some of my emotions are bad or inappropriate and I shouldn't be feeling them.	1	2	3	4	5
9. I disapprove of myself when I have irrational ideas.	1	2	3	4	5

Appendix K

Ruminative Responses Scale

People think and do many different things when they FEEL DEPRESSED.

Please read each of the items below and indicate whether you never, sometimes, often, or always think or do each one when you FEEL DOWN, SAD, OR DEPRESSED.

Please indicate what you generally do, not what you think you should do.

	Never	Sometimes	Often	Always
1. Think about how alone you feel	1	2	3	4
2. Think "I won't be able to do my job/work if I don't snap out of this"	1	2	3	4
3. Think about your feelings of fatigue and achiness	1	2	3	4
4. Think about how hard it is to concentrate	1	2	3	4
5. Think "What am I doing to deserve this?"	1	2	3	4
6. Think about how passive and unmotivated you feel	1	2	3	4
7. Analyze recent events to try to understand why you are depressed	1	2	3	4
8. Think about how you don't seem to feel anything anymore	1	2	3	4
9. Think "Why can't I get going"	1	2	3	4
10. Think "Why do I always react this way?"	1	2	3	4
11. Go away by yourself and think about why you feel this way	1	2	3	4
12. Write down what you are thinking and analyze it	1	2	3	4

	Never	Sometimes	Often	Always
13. Think about a recent situation wishing it had gone better	1	2	3	4
14. Think “I won’t be able to concentrate if I keep feeling this way”	1	2	3	4
15. Think “Why do I have problems other people don’t have?”	1	2	3	4
16. Think “Why can’t I handle things better?”	1	2	3	4
17. Think about how sad you feel	1	2	3	4
18. Think about all your shortcomings, failings, faults, and mistakes	1	2	3	4
19. Think about how you don't feel up to doing anything	1	2	3	4
20. Analyze your personality to try to understand why you are depressed	1	2	3	4
21. Go someplace alone to think about your feelings	1	2	3	4
22. Think about how angry you are with yourself	1	2	3	4

Appendix L

Emotional Schema Scale

We are interested in how you deal with your feelings or emotions – for example, how you deal with feelings of anger, sadness, anxiety, or sexual feelings. We all differ in how we deal with these feelings, so there are no right or wrong answers. Please read each sentence carefully and answer each sentence, using the scale below, as to how you deal with your feelings during the past month. Put the number of your response next to the sentence.

Scale: 1 = very untrue of me
2 = somewhat untrue of me
3 = slightly untrue of me
4 = slightly true of me
5 = somewhat true of me
6 = very true of me

1. ___ Some feelings are wrong to have.
2. ___ When I feel down, I sit by myself and think a lot about how bad I feel.
3. ___ I worry that if I have certain feelings I might go crazy.
4. ___ You can't allow yourself to have certain kinds of feelings – like feelings about sex or violence.
5. ___ I think that there are feelings that I have that I am not really aware of.
6. ___ My feelings seem to come out of nowhere.
7. ___ When I have a feeling that bothers me I try to think of something else to think about or do.
8. ___ If I let myself have some of these feelings, I fear that I will lose control.
9. ___ There are things about myself that I just don't understand.
10. ___ I often say to myself, "What's wrong with me?"
11. ___ I feel ashamed about my feelings.
12. ___ I want people to believe that I am different from the way I truly feel.
13. ___ I focus a lot on my feelings or my physical sensations.
14. ___ I feel that I can express my feelings openly.
15. ___ My feelings don't make sense to me.

Scale: 1 = very untrue of me
2 = somewhat untrue of me
3 = slightly untrue of me
4 = slightly true of me
5 = somewhat true of me
6 = very true of me

16. ___ I try to get rid of an unpleasant feeling immediately.
17. ___ You have to guard against having certain feelings.
18. ___ When I feel down, I try to think about a different way to view things.
19. ___ I worry that I won't be able to control my feelings.
20. ___ I think that my feelings are strange or weird.
21. ___ I accept my feelings.
22. ___ I believe that it is important to let myself cry in order to get my feelings "out."
23. ___ I don't want to admit to having certain feelings – but I know that I have them.
24. ___ I shouldn't have some of the feelings that I have.
25. ___ When I have a feeling that bothers me, I try to think of why it is not important.

Appendix M

Frequency and Percentage of Participants Who Correctly Answered RAT Related and Neutral Words in Each Emotional Processing Condition

		Acceptance n = 26	*Evaluation* n = 21	*Control* n = 61
RAT Related Words				
Association[†‡]	(as*ocia*i*n)	23(88.5%)	18(85.7%)	54(88.5%)
Disappoint	(di*ap*oi*t)	11(42.3%)	7(33.3%)	23(37.7%)
Incapable	(in*ap*bl*)	4(15.4%)	4(19.0%)	16(26.2%)
Frustrated[‡]	(f*us*ra*ed)	26(100%)	21(100%)	60(98.4%)
Unsatisfied[‡]	(u*s*t*sf*ed)	21(80.8%)	15(71.4%)	52(85.2%)
Discouraged[‡]	(d*sc*ur*ged)	26(100%)	21(100%)	60(98.4%)
Upset[‡]	(up**t)	25(96.2%)	20(95.2%)	54(88.5%)
Ability[†‡]	(ab**i*y)	25(96.2%)	16(76.2%)	49(80.3%)
Word[†‡]	(w*rd)	23(88.5%)	19(90.5%)	55(90.2%)
Worse	(wo**e)	6(23.1%)	1(4.8%)	4(6.6%)
Weakness[‡]	(w**k*ess)	25(96.2%)	21(100%)	58(95.1%)
Mistake[‡]	(m*st*k*)	26(100%)	20(95.2%)	57(93.4%)
Defeat	(d*f*a*)	1(3.8%)	1(4.8%)	4(6.6%)
Negative[‡]	(n*g*t*ve)	26(100%)	20(95.2%)	59(96.7%)
Poor[‡]	(p*or)	21(80.8%)	19(90.5%)	46(75.4%)
Terrible[‡]	(t*r*ib*e)	21(80.8%)	19(90.5%)	51(83.6%)
Unsuccessful[‡]	(u*s*cce*sf*l)	25(96.2%)	21(100%)	60(98.4%)
Confusing	(c*nf*s*n*)	14(53.8%)	13(61.9%)	35(57.4%)
Inadequate[‡]	(i*ad*q*at*)	25(96.2%)	20(95.2%)	60(98.4%)
Error	(er*o*)	14(53.8%)	4(19.0%)	30(49.2%)

		Acceptance n = 26	*Evaluation* n = 21	*Control* n = 61
Neutral Words				
Automobile	(a*t*m*b*le)	12(46.2%)	7(33.3%)	25(41.0%)
Regulate	(r*g*l*te)	5(19.2%)	6(28.6%)	13(21.3%)
Incredible‡	(i*cr*d**le)	25(96.2%)	21(100%)	59(96.7%)
Agreeable‡	(ag**e*b*e)	24(92.3%)	18(85.7%)	51(83.6%)
Sterile	(s*e*ile)	5(19.2%)	2(9.5%)	15(24.6%)
Digital	(di*it*l)	7(26.9%)	4(19.0%)	13(21.3%)
Healing	(he*l*n*)	26(100%)	1(4.8%)	1(1.6%)
Bright	(b*i*ht)	6(23.1%)	9(42.9%)	11(18.0%)
Clean	(c*e*n)	2(7.7%)	5(23.8%)	3(4.9%)
Friendship‡	(f*i*nds*ip)	26(100%)	21(100%)	60(98.4%)
Sweet‡	(sw*et)	26(100%)	21(100%)	59(96.7%)
Radio	(r*di*)	2(7.7%)	1(4.8%)	4(6.6%)
Freezing	(f*e*zi*g)	17(65.4%)	18(85.7%)	39(63.9%)
Coffee	(c*f*e*)	14(53.8%)	10(47.6%)	35(57.4%)
Independent	(i*de*en*en*)	6(23.1%)	6(28.6%)	7(11.5%)
Likable‡	(l*k*b*e)	25(96.2%)	19(90.5%)	53(86.9%)
Tasty	(t*s*y)	4(15.4%)	4(19.0%)	20(32.8%)
Television‡	(t*le*is*on)	23(88.5%)	14(66.7%)	42(68.9%)
Musical	(m*si*al)	3(11.5%)	21(100%)	8(13.1%)
Invisible‡	(i*v*si*le)	23(88.5%)	18(85.7)	55(90.2%)

† Words from the RAT instructions

‡ Words used to calculate mean reaction times

Appendix N

Flow-chart of Study Procedures

Phase One
Complete online battery of questionnaires

Phase Two
Upon arrival to study session, complete consent form and BDI
Randomly assigned to emotional processing condition (acceptance, evaluation, control)
↓
Complete PANAS 1 (self-report measure of mood)
↓
Hook-up to physiological monitor
↓
8 minute sit (gather baseline physiological data)
↓
RAT and RAT feedback with false norms (negative mood induction)
↓
PowerPoint presentation
↓
Complete PANAS 2
↓
Writing 1 – eight minutes (allow for emotional processing)
↓
Sitting 1 – three minutes (allow for emotional processing)
↓
Complete PANAS 3
↓
Writing 2 – ten minutes (allow for emotional processing)
↓
Sitting 2 – three minutes (allow for emotional processing)
↓
Complete PANAS 4
↓
Word Recognition task (measure rumination about negative mood induction)
↓
Unhook-up from physiological monitor and probe beliefs about study
↓
Debrief and complete post-debriefing consent form

Appendix O

Script

Set-Up:

- 2 Computers, physiological monitors, blank paper, and tray on the table
- Turn off the overhead lights and use the two lamps
- Make sure alcohol, Kleenex, and cotton swabs are on cart
- Make sure RAT materials, and stopwatch are on cart
- Make sure blinds are down and closed over the one-way mirror

On Participants' Computer (Dell):

- Computer password is "kitty"
- Open up the classical music file ... from the start menu, select Windows Media Player, then media library, then all music, artists, and classical music ... minimize the media player
- Open the powerpoint that corresponds to the condition (A, B, C, D, or E)
- Minimize Application
- Open the Word Recognition Program
- Minimize Application

On Experimenters' Computer (Toshiba):

- Computer password is "Success1" (case sensitive)
- Open Physio Program
    - click on "USE3" icon on desktop
    - select "run session"
    - make sure "I-330-C2 PLUS 6 ch" is selected on hardware type menu
    - select "breathing training & HRV C2+6" as your application
    - hit start
    - go to "check signals #1" screen from the toolbar at the top

Make sure the physio monitoring box (the one the sensors are plugged into) is placed at least 18" from either of the laptops.

To select a packet:

- Select Participant Packet that corresponds to next number on Randomization Chart. Randomization Chart is on the cart; packets are in Stephanie's office.
- Mark off the number you "used" on the Randomization Chart

Order of pages in packet:

1. Consent page
2. demographic questionnaire
3. BDI
4. PANAS 1
5. RAT form
6. PANAS 2
7. writing 1
8. PANAS 3
9. writing 2
10. PANAS 4
11. word recognition scoring page
12. probe questions
13. debriefing form
14. post-debriefing consent

- make sure HR monitor is on (it turns itself off automatically when not in use)

INTRO

First of all I would like to welcome you to our study! My name is _____ and I will be here with you during this experiment for the next hour and a half or so. Because this study takes a bit of time, please feel free to run to the restroom or get a sip or water before we get started.

I'm going to ask you to turn off your cell phone just so we don't get interrupted. I also need you to remove any gum or candy currently in your mouth, as it could interfere with certain parts of the study.

CONSENT

Here is the consent form, which will briefly describe what your participation will entail. *We'll be asking you to do some different tasks that cover a range of research questions and focuses*. Please read over it and let me know if you have any questions. If you want to participate in the study, please sign and date the form in the appropriate places. Also, let me know if you would like to keep a copy of the consent form.

ID CODE

I'm going to ask you to put an "ID code" at the top of each paper you fill out today. This will let us know that your papers belong together, but they will not be able to be traced back to you in any way. Your code will contain the first three letters of your mother's maiden name and the day of the month that you were born. For example, if your mother's maiden name was SIMPSON, and your birthday was January 4, your code would be SIM4. Take a second to figure out your ID Code, and let me know if you have any questions.

DEMOGRAPHIC QUESTIONNAIRE

The first thing I'm going to ask you to do is to answer the questions on this page. <Hand participant demographic questionnaire> **Please put your ID code at the top. Once you complete the questionnaire, place it face down in this tray. I'll be asking you to do the same with each of the forms you fill out during the experiment – just put them in this tray once you're done.**

BDI

The next thing I'm going to ask you to do is complete a brief questionnaire. <Hand participant BDI>

Remember, record your ID Code at the top of the page. <pause while they write>

To complete this questionnaire, please read each group of statements and choose the one that best describes how you've been feeling in the past two weeks. If more than one seems to fit, you can just circle them both, and when you're done I'll score it quickly and we'll move on.

Wait while participant completes the BDI.

PANAS 1

Now I'm going to ask you to rate how you are feeling right now using a mood thermometer. I'm actually going to be asking you to do this several times throughout the study, and the instructions will be the same each time.

<Hand participant PANAS 1>

On this sheet there are several different emotions, and I want you to rate how much you are feeling each one right at this moment. I am going to step outside of the room for a moment while you complete the form. When you're done, just place it in the tray.

<While they complete it, score the BDI outside the room. >

BDI SCORING

BDI > 19 (return to room and say to participant)

"Part of this study involves asking participants to engage in a stressful task. Your answers on this questionnaire suggest that you are already experiencing some stress, maybe even a lot. Because of that, we don't want you to have to do anything that might add to your stress level, and so you don't have to continue on to the rest of the session. However, you will receive full credit for your participation.

Also, we're giving everybody who comes in for the study some information about services offered here on campus, such as the contact information for the Mental Health Center and also a 24-hour hotline number. These services are always available if you feel like they would be helpful to you in any way. Also, if you'd like to call the hotline number now using a phone that we have, please feel free to do so. If you don't, just know that it's always available if you'd ever like to call it."
Give participant consent form (non signature pages) and circle CMHC # and Hotline #.

Question # 9, Option 2 or 3 marked (return to room and say to participant)
"This questionnaire that you just completed asks people about different difficulties that they might be experiencing. You indicated on the questionnaire that you: *have thoughts about killing yourself* OR *you would kill yourself if you had the chance*.

This is a concern for me, and there are a few steps that I'd like to take since I want to be sure that you will be able to keep yourself safe. There's a 24 hour helpline here at UT whose whole purpose is to help out students experiencing difficulties like you're describing. What I'd like to do is call that number and have you talk w/ somebody who can help us know what we can do to help you out right now. I will call them and explain the situation. Then I will hand the phone to you so you can talk with them, while I step out of the room. Then, when you are finished and before hanging up, hand the phone back to me, so I can check in w/ that person and see what he or she thinks we can do. Does all this sound okay?"
Call helpline: (512-471-CALL). Follow plan operator thinks is appropriate.

In case of emergency or any questions, call:
Stephanie: 512-468-7833
OR
Mandy: 512-924-0404
Roni: 210-632-6239

PHYSIO HOOKUP

<Return to room, place BDI face down in tray, and continue>

Let me tell you a little bit about all of this equipment that you see here. I'm going to ask you to wear sensors on your fingers during the course of the study that will allow us to measure things like your heart rate and skin conductance. I'll place these two cuffs around the index and ring fingers of your non-dominant hand ... are you right or left handed? To help us get a better reading, I'm going to wipe your fingers off with alcohol ... are you allergic to alcohol? <Wipe the fingers w/ alcohol on a cotton pad.> **I'm also going to place a little gel on your finger which helps us to get a better reading, then I'll put the cuff on.** <Place the conductance gel on the participant's finger, then place the cuff on the hand.> **The idea is to have these snug enough that we get a good reading but not so tight that it is uncomfortable to you. How does all that feel?**

I'm also going to ask you to put this lapdesk in your lap, and if you can place your hand on the desk, I'll wrap these Velcro straps around your hand ... this also helps us to get a better reading, as lots of movement can alter the accuracy of the readings. Is that comfortable?

PHYSIO BASELINE

In this next part, I'm going to ask you to just sit quietly and relax for about 8 minutes.

<**Start recording** the "baseline" phase. Stay in the room, sitting away from or behind the participant. After 8 minutes, **stop the recording**.>

How to start recording and stop recording a task:

- click the button w/ the pink and yellow rectangle – this brings up the task list (it's titled "6 minute stress profile")
- select the task you want to run by clicking on it, then hit "run selected task"

- the task should start recording; if for some reason it does not, click on the bar that says “click here to activate recording” ... if it’s recording you’ll see the letters “REC” in red next to the task name at the bottom of the screen
- when you are ready to stop recording, hit the button w/ a red dot
- open up the task list by clicking on the button w/ rectangle; the completed tasks should have check marks by them; select the task you want to run and hit the “run selected task” button
- proceed in this manner until all tasks have been run

RAT INSTRUCTIONS

<Start recording “RAT instructions” phase>
The next thing we’re going to do is a word task that serves as a measure of problem solving ability. <Present answer sheet> **Please put your ID code at the top. The way this will work is I will show you a card that has three words on it, and your goal is to think of a fourth word that is related to the words on the card. When you think of a fourth word, write the word on your sheet next to the number that corresponds to the number on the card.**

Here’s an example.
<Place the sample card face up on the table so it faces the participant.>
The words on the card are “athletes,” “web,” and “rabbit.” The correct answer is “foot” because “foot” is related to each of the three words, *as in “athlete’s foot,” “webbed foot,” and “rabbit’s foot,”* so the word “foot” would go in the blank. Go ahead and write “foot” in the appropriate blank.

Ok, there will be 15 cards with three words on each card. You will have 30 seconds to look at each card and record an answer, and then we will go on to the next one. Please write an answer for every item, even if it is just a guess. *If you feel like you’re not doing well, don’t worry, most people only get 7 to 9 correct.* *Point to the 7-9 range on the scoring part of the sheet.* **If any questions come up during this task, just hold on to them and we’ll have time at the end of the study to go over any questions you have.**

<**Stop recording** the "RAT instructions" phase>

RAT ADMINISTRATION

<**Start recording** the "RAT" phase.

Okay, here we go.
<Present card 1 and **start stopwatch**. After 30 seconds passes OR after the participant writes an answer, present card 2. Proceed in this manner until all the cards have been presented.>
<**Stop recording** "RAT" phase>

RAT FEEDBACK

<**Start recording** "RAT feedback" phase.>

Okay we're done! I'm going to score your answers, and then we'll continue on.
<Score participant's answers while sitting at the table, turned away so they cannot see answer key. Mark wrong answers with a slash through the number next to the answer; make no marks next to a correct answer. While the participant looks on, circle their score on the scoring section of the answer sheet. Show the participant their sheet.>

Here's your score, it looks like you got ____ of the problems correct.
<**Stop recording** the "RAT Feedback" phase.>

POWERPOINT

Okay, great, now we're going to switch research focuses a bit. **In the next part of the study you are going to watch a powerpoint presentation that will give you some information about emotions. It will be really helpful if you pay attention to what is being said and let yourself think about the message that is being conveyed. You can scroll through at your own pace using the up and down arrow keys at the bottom of the keyboard. Let me know when you reach the end.**

< Start recording the "powerpoint" phase. Maximize the powerpoint and **hit F5** to start it. When participant is through reading, **stop the recording**. Close the powerpoint and shut the computer lid.>

PANAS 2

<Start recording "PANAS 2" phase>

Next, please fill out another mood thermometer.

<Give them PANAS #2.>

<**Stop recording** the "PANAS 2" phase when finished.>

WRITING 1

<Start recording the "writing 1" phase. Give the participant "Writing" prompts.

Next, you will be writing in response to the prompts on this page. You will be writing for a total of 8 minutes. First, you will read the first prompt and write continuously for 3 minutes in response to it. Then I will say "NEXT" and you should read the second prompt and write continuously in response to it for 5 minutes. If you need more paper there are some blank sheets here you can use. Any questions?

<Start stopwatch when participant begins writing to prompt #1. Stop stopwatch after 3 minutes. Say "NEXT," and start stopwatch when participant starts writing again. Stop Stopwatch after 5 minutes.>

Okay, stop writing, and place your paper face down in the tray.

<**Stop recording** "writing 1" phase.>

SITTING 1

<**Start recording** "Sitting 1" phase>

Now I'm going to ask you to sit quietly for just a few minutes.

<**Stop recording** after 3 minutes.>

PANAS 3

<**Start recording** "PANAS 3" phase>

Now please fill out another mood thermometer.

<Give them PANAS #3.>

<**Stop recording** the "PANAS 3" phase when finished.>

WRITING 2

<**Start recording** "Writing 2" phase. Hand participant Writing 2 sheet>

Next, you're going to have time to write again, but this time you will write for ten minutes. Please write about whatever is going through your mind right now. There's no right or wrong thing to write about, just whatever you're thinking about is fine. Please write continuously for the entire 10 minutes.

<**Stop recording** after 10 minutes.>

SITTING 2

<**Start recording** the "sitting 2" phase.>

Okay, please put your paper face down in the tray. Next, I'm going to ask you to sit quietly again for just a few minutes, just like before.

<Stop recording after 3 minutes.>

PANAS 4

<**Start recording** "PANAS 4" phase.>

<Hand PANAS 4 to participant>

Now I'm going to ask you to fill out another mood thermometer.

<**Stop recording** "PANAS 4" phase when they're done>

WORD RECOGNITION INSTRUCTION and PRACTICE

<**Start recording** "Word recognition instructions and practice" phase.>

Now we're going to do another task on the computer. What's going to happen is words are going to appear on the screen. These words will have stars in place of some of the letters. What I want you to do is hit the spacebar when you recognize the word, and say the word as you hit the spacebar. You might be tempted to say the word then hit the spacebar, but we're trying to see how quickly you recognize the words and the time is recorded based on when you hit the spacebar, so be sure to hit the spacebar and say the word AT THE SAME TIME. We'll do several practice trials. Do you have any questions about how this is going to work?

<Maximize the response task. Select "run" from the "experiment" tab. Enter the participant's ID code. Make sure "save collected data" is checked. Click run. Save the file as the participant's password in the folder labeled "word recognition data" on the desktop. Situate the computer in front of the participant. Use <shift 1>, the exclamation point, to start the task. Have the response record sheet ready. Sit slightly behind the participant so he/she cannot see the response record sheet. When the subject goes through all the examples and all his/her questions have been answered, **stop recording** the "instructions and practice" phase.>

<**Start recording** the "word recognition task" phase. Use <Shift 1> to start the task and record the responses using the instructions on the bottom of the response record sheet. Be sure to correct participants who are not hitting the space bar and saying the word simultaneously.

<**Stop recording** when finished.>

Okay, great, that's everything! You can go ahead and take off the sensors ... here is a tissue so you can wipe off the metal parts of the sensors and your fingers.

I'd like to ask you a few questions about the study now.

<Ask questions from the question probe sheet and record answers.>

Here is a sheet with some information about the study, and I'd like to go over a few things with you.

<Give them debriefing form, and go over the paragraph that discusses the areas of misinformation.>

Do you have any questions about what we just went over? I'm going to ask you to sign this form, which indicates that you understand all parts of the study, including the aspects that were a little misleading, and you will allow us to use the data we collected from you today for our research.

<Have them sign the final consent form.>

Here is your participant receipt. Hold on to this paper, as the participant receipt is the only way you can prove that you came today and completed your time in case there's a mix-up down the road. You can contact any of the individuals listed there (Roni, Mandy, and Stephanie) **if you have any questions or concerns after you leave here today. Please note that the contact information for the counseling center and UT's help line are given in case you would like to use those services at any point.**

<u>To export the physio data after the session has ended:</u>

- make sure the last task has stopped recording
- hit the arrow button on the far left hand corner of the screen (this terminates the session)
- select "new client" in the box that pops up
- type in the participant's ID code in the "alias name" field, select the sex, and hit okay
- hit "save to database" then hit "export"
- in the box, make sure Excel is chosen as the export type, all options to be included are selected (client info, session date/time, and application), 30 is chosen in the "update" box, and average only is the statistic; click okay
- an excel file should pop up; if a box pops up asking if you want to replace "_1.xls" select "no"
- save the Excel in the "physio data M&R study" folder on the desktop; name it the participant's ID code
- close the Excel file
- if there is a box saying that the Microsoft Excel program is not responding, select "retry" and click "okay" to the "general exception caught" box
- everything should close out and you're ready for the next person

Write the participant's ID code, date, time, and your initials on the outside of the folder. Be sure that you put the consent forms in the consent form file and the folder from the session in the crate in Stephanie's office. If there is nobody running subjects after you, take the cart with the computer, physiological monitors, and questionnaires back to Stephanie's office. If somebody is running subjects after you but is not there and you have to go, take the laptops and physio equipment to Stephanie's office.

Appendix P

Probe Questions

What did you think was going on in the study?

_____
_____
_____

At any point did you doubt or question any aspect of the study?

_____
_____
_____

At the time that you got the feedback regarding your performance on the problem solving task, did you think that feedback was valid?

_____
_____
_____

Have you ever been in any study that asked you to write, similar to this one? If so, what were you asked to write about?

_____
_____
_____

Did anyone tell you anything about this study before you participated today? If so, what did they tell you?

_____
_____
_____

Appendix Q

Descriptive Statistics on Demographic Variables for Acceptance, Evaluation, and Control Groups

	Acceptance *of Emotion* n = 26	Evaluation *of Emotion* n = 21	Control n = 61
Gender			
Male	12(46.2%)	11(52.0%)	28(45.9%)
Female	14(53.8%)	10(47.6%)	33(54.1%)
Age			
Mean	21.50	22.24	21.36
SD	1.73	3.33	1.78
Year in School			
Freshman	2(7.7%)	0(0.0%)	7(11.5%)
Sophomore	2(7.7%)	1(4.8%)	3(4.9%)
Junior	5(19.2%)	4(19.0%)	10(16.4%)
Senior	17(65.4%)	16(76.2%)	41(67.2%)
Race			
White	20(76.9%)	14(66.7%)	41(67.2%)
Non-White	6(23.1%)	7(33.3%)	20(32.8%)
Asian	2(7.7%)	3(14.3%)	10(16.4%)
Black	1(3.8%)	1(4.8%)	5(8.2%)
Hispanic	3(11.5%)	2(9.5%)	1(1.6%)
Bi/Multi	0(0.0%)	1(4.8%)	4(6.6%)

	Acceptance of Emotion n = 26	*Evaluation of Emotion* n = 21	*Control* n = 61
Ethnic Identification			
No Endorsement[†]	21(80.8%)	15(71.4%)	46(75.4%)
Endorsement[†]	5(19.2%)	6(28.6%)	15(24.6%)
Asian	2(7.7%)	3(14.3%)	5(8.2%)
African	0(0.0%)	1(5.0%)	2(3.3%)
Hispanic	3(11.5%)	1(5.0%)	2(3.3%)
Middle East	0(0.0%)	0(0.0%)	2(3.3%)
Jewish	0(0.0%)	0(0.0%)	1(1.6%)
European	0(0.0%)	1(5.0%)	3(4.9%)

[†] Participants were asked if they identified with a particular ethnic group. If they indicated no, they are listed in the No Endorsement row. If they indicated yes, they were asked to specify which ethnic group, and they are listed in the endorsement row, and also in the row for the ethnic group they specified.

Appendix R

Means and Standard Deviations for Trait Measures of Rumination and Emotional Acceptance

Measure	N	Mean	SD
Kentucky Inventory of Mindfulness (KIMS) -Accept without Judgment subscale	103	27.99	7.51
Leahy Emotional Schemas Scale (LESS)-Rumination subscale	103	17.36	4.27
Ruminative Responses Scale (RRS)	44	51.68	10.76

Appendix S

Correlations among the Trait Measures.[†]

	RRS	*LESS Rumination*	*KIMS Accept without Judgment*
RRS	*(.91)*[‡]		
LESS Rumination	*.56**	*(.53)*[‡]	
KIMS Accept without Judgment	*-.44**	*-.61**	*(.90)*[‡]

* $p < .05$

[†] Due to small n of RRS sample and incomplete data for some participants, correlations involving RRS are based on n=40, while correlations not involving RRS are based on n=103.

[‡] Values in parenthesis are Cronbach alpha reliability coefficients.

Appendix T

Correlations among the Six Baseline Mood Measures

	Heart Rate	Skin Conductance	Skin Temperature	Positive Affect	Negative Affect	BDI
Baseline Heart Rate	1					
Baseline Skin Conductance	.15	1				
Baseline Skin Temperature	.14	-.12	1			
Baseline Positive Affect	-.13	.03	.10	1		
Baseline Negative Affect	-.03	.12	-.03	.07[†]	1	
BDI	.08	.08	.00	-.11[†]	.47*[†]	1

*$p < .01$

[†] n = 108 (for all other correlations, n = 104)

Appendix U

Descriptive Statistics for Heart Rate Across Time for Acceptance, Evaluation, and Control Groups[†]

Condition	Time of Measurement					
	Baseline HR	Feedback HR	Writing 1 HR	Sitting 1 HR	Writing 2 HR	Sitting 2 HR
Acceptance						
Mean	118.75	123.29	115.93	120.80	117.42	116.50
SD	7.78	19.81	6.35	11.83	6.24	10.08
Evaluation						
Mean	118.40	123.61	118.20	116.96	115.29	118.38
SD	8.16	30.11	6.27	7.01	6.99	12.78
Control						
Mean	116.86	117.50	115.54	115.26	117.59	118.42
SD	6.24	16.77	6.66	11.32	5.90	11.04

[†] Heart rate was measured in beats per minute.

Appendix V

Descriptive Statistics for Skin Conductance across Time for Acceptance, Evaluation, and Control Groups[†]

Condition	Time of Measurement					
	Baseline SC	Feedback SC	Writing 1 SC	Sitting 1 SC	Writing 2 SC	Sitting 2 SC
Acceptance						
Mean	4.89	6.44	6.30	6.24	6.08	6.00
SD	1.96	2.28	2.70	2.89	2.91	2.90
Evaluation						
Mean	4.45	6.21	5.82	5.77	5.85	5.87
SD	2.24	2.41	2.45	2.39	2.96	2.97
Control						
Mean	4.33	6.06	5.77	5.72	5.53	5.58
SD	2.11	2.36	2.35	2.35	2.22	2.28

[†]Skin conductance (SC) was measured in uMhos.

Appendix W

Descriptive Statistics for Skin Temperature across Time for Acceptance, Evaluation, and Control Groups[†]

Condition	Time of Measurement					
	Baseline ST	Feedback ST	Writing 1 ST	Sitting 1 ST	Writing 2 ST	Sitting 2 ST
Acceptance						
Mean	75.33	75.88	77.35	77.09	77.12	76.59
SD	1.22	1.44	2.98	3.28	2.85	2.05
Evaluation						
Mean	77.78	78.01	77.85	78.54	78.55	77.93
SD	1.22	5.55	4.42	5.53	5.67	3.81
Control						
Mean	76.48	77.09	77.11	77.03	77.18	77.15
SD	2.52	2.38	2.59	2.39	2.62	2.62

[†] Skin Temperature (ST) was measured in degrees Fahrenheit.

Appendix X

Correlations among Heart Rate Measurements in Six Study Phases[†]

	Baseline HR	RAT FB HR	Writing 1 HR	Sitting 1 HR	Writing 2 HR	Sitting 2 HR
Baseline HR	1					
RAT FB HR	.10	1				
Writing 1 HR	-.07	.06	1			
Sitting 1 HR	-.09	-.09	-.01	1		
Writing 2 HR	.19	.01	-.01	-.10	1	
Sitting 2 HR	-.01	-.03	-.10	.05	-.23*	1

* $p < .05$

[†] Sample sizes for correlations vary between n = 102 to n = 104.

Appendix Y

Correlations among Skin Conductance Measurements in Six Study Phases[†]

	Baseline SC	RAT FB SC	Writing 1 SC	Sitting 1 SC	Writing 2 SC	Sitting 2 SC
Baseline SC	1					
RAT FB SC	.80*	1				
Writing 1 SC	.80*	.98*	1			
Sitting 1 SC	.80*	.98*	1.00*	1		
Writing 2 SC	.80*	.96*	.98*	.98*	1	
Sitting 2 SC	.79*	.95*	.97*	.98*	.99*	1

* $p < .01$

[†] Sample sizes for correlations vary between n = 102 to n = 104.

Appendix Z

Correlations among Skin Temperature Measurements in Six Study Phases[†]

	Baseline ST	RAT FB ST	Writing 1 ST	Sitting 1 ST	Writing 2 ST	Sitting 2 ST
Baseline SC	1					
RATfeedback SC	.86*	1				
Writing 1 SC	.61*	.75*	1			
Sitting 1 SC	.65*	.75*	.89*	1		
Writing 2 SC	.60*	.68*	.81*	.89*	1	
Sitting 2 SC	.53*	.63*	.74*	.84*	.90*	1

* $p < .01$

[†] Sample sizes for correlations vary between n = 102 to n = 104.

Appendix AA

Descriptive Statistics for the Positive Affect (PA) Subscale of the PANAS Across Four Measurement Phases for Acceptance, Evaluation, and Control Groups

Condition	Time of Measurement			
	PA 1	PA 2	PA 3	PA 4
Acceptance				
Mean	25.35	23.23	21.19	21.04
SD	9.51	7.68	8.39	8.53
Evaluation				
Mean	24.62	21.52	19.81	20.38
SD	7.27	7.07	6.84	7.39
Control				
Mean	23.54	20.85	18.57	17.46
SD	7.86	6.71	6.74	6.73

Appendix BB

Descriptive Statistics for the Negative Affect (NA) Subscale of the PANAS across Four Measurement Phases for Acceptance, Evaluation, and Control Groups

Condition	Time of Measurement			
	NA 1	NA 2	NA 3	NA 4
Acceptance				
Mean	12.81	12.85	12.62	11.65
SD	2.93	3.55	3.23	1.77
Evaluation				
Mean	13.00	13.29	12.24	12.43
SD	3.32	4.21	2.59	2.86
Control				
Mean	13.21	14.95	13.25	13.82
SD	4.25	5.49	4.15	4.36

Appendix CC

Correlations among Positive Affect (PA) and Negative Affect (NA) Subscales of the PANAS in Four Study Phases.[†]

	PA1	NA1	PA2	NA2	PA3	NA3	PA4	NA4
PA1	(.90)[‡]							
NA1	.07	(.81)[‡]						
PA2	.84*	.08	(.89)[‡]					
NA2	.17	.67*	.14	(.88)[‡]				
PA3	.82*	.16	.91*	.21	(.91)[‡]			
NA3	.11	.71*	.15	.75*	.16	(.86)[‡]		
PA4	.73*	.17	.84*	.19	.92*	.16	(.92)[‡]	
NA4	.08	.73*	.07	.70*	.07	.82*	.05	(.85)[‡]

**p < .05*

[†] All correlations based on n=108.

[‡] Values in parenthesis are Cronbach alpha reliability coefficients.

Appendix DD

Correlations among PANAS Subscales and Physiological Measures in Six Study Phases.[†]

	PA1	NA1	PA2	NA2	PA3	NA3	PA4	NA4
Baseline HR	-.13	-.03	-.08	-.06	-.14	-.04	-.19	.04
Baseline SC	.03	.12	.17	-.03	.13	-.01	.18	-.06
Baseline ST	.10	-.03	.07	.06	.07	-.10	.07	-.07
RAT FB HR	-.02	-.05	.08	-.14	.02	-.12	.10	-.09
RAT FB SC	.06	.23	.18	.04	.15	.04	.18	-.01
RAT FB ST	.14	.01	.07	.11	.06	-.10	.07	-.04
Writing 1 HR	.11	-.11	.05	-.14	.08	.01	.06	-.03
Writing 1 SC	.08	.23*	.20*	.06	.17	.06	.20*	.01
Writing 1 ST	.20*	.02	.21*	.06	.18	-.09	.21*	-.08
Sitting 1 HR	-.15	.09	-.15	-.05	-.13	-.07	-.13	-.11
Sitting 1 SC	.07	.24	.19	.06	.16	-.07	.19	.01
Sitting 1 ST	.16	.08	.19	.09	.16	-.07	.21*	-.08
Writing 2 HR	-.01	.04	-.14	.08	-.18	.05	-.14	.13
Writing 2 SC	.08	.22*	.21*	.05	.19*	.06	.23*	.02
Writing 2 ST	.12	.04	.11	.12	.12	-.05	.13	-.07
Sitting 2 HR	-.01	.14	.03	.11	.04	.08	.09	.09
Sitting 2 SC	.09	.23*	.21*	.05	.20*	.06	.22*	.03
Sitting 2 ST	.00	.03	.00	.08	-.01	-.07	.02	-.09

* $p < .05$

[†] Sample sizes for correlations vary between n = 102 to n = 104.

Appendix EE

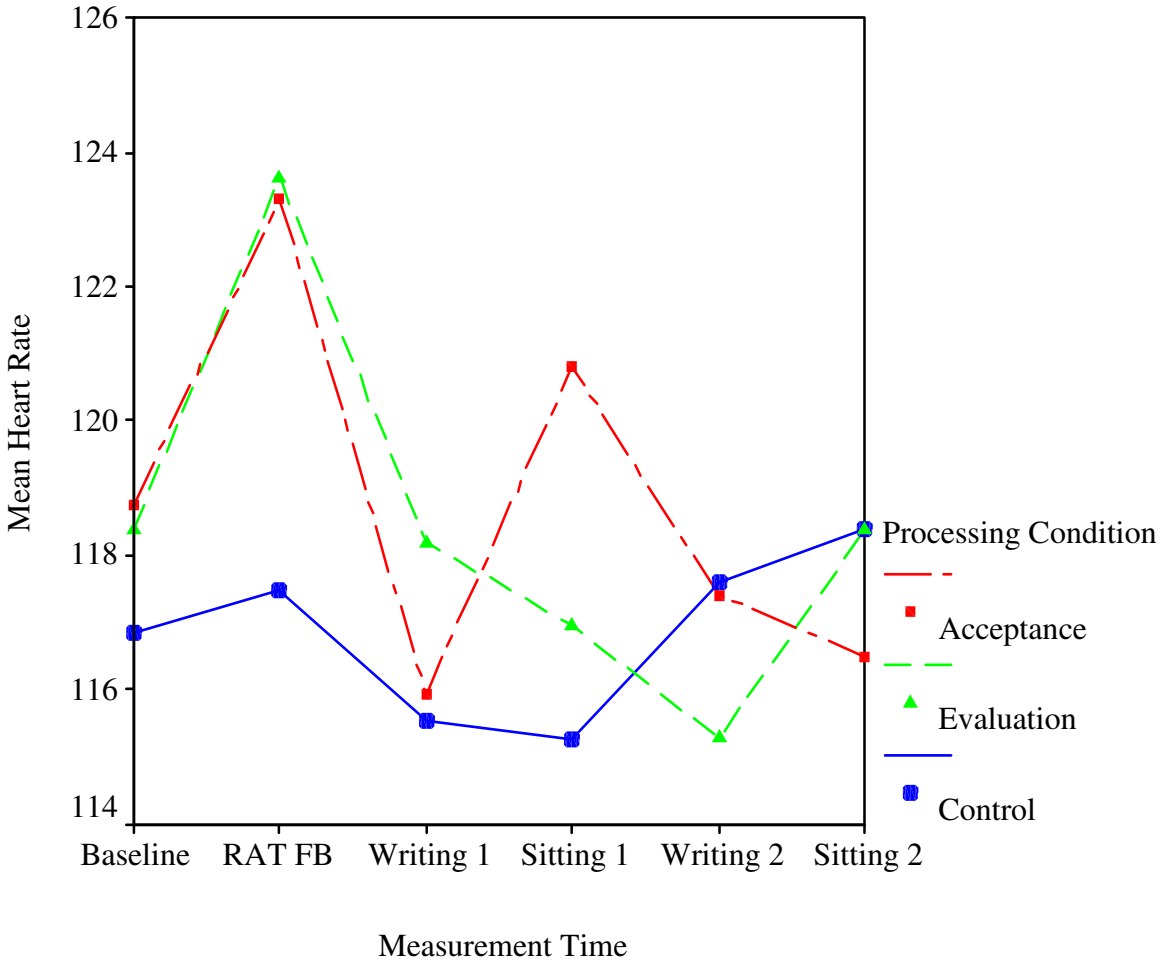
Descriptive Statistics on Four Word Recognition Variables for Acceptance, Evaluation and Control Groups

	Acceptance of Emotion n = 26	*Evaluation of Emotion* n = 21	*Control* n = 61
Number Correct			
RAT Related			
M	14.92	14.29	14.54
SD	1.60	1.71	2.13
Neutral			
M	9.81	9.76	9.39
SD	2.17	2.10	2.42
Reaction Time[†]			
RAT Related			
M	731.99	775.97	803.86
SD	144.07	125.75	174.00
Neutral			
M	796.16	772.77	829.87
SD	212.77	128.02	210.54

[†] Reaction time is measured in milliseconds.

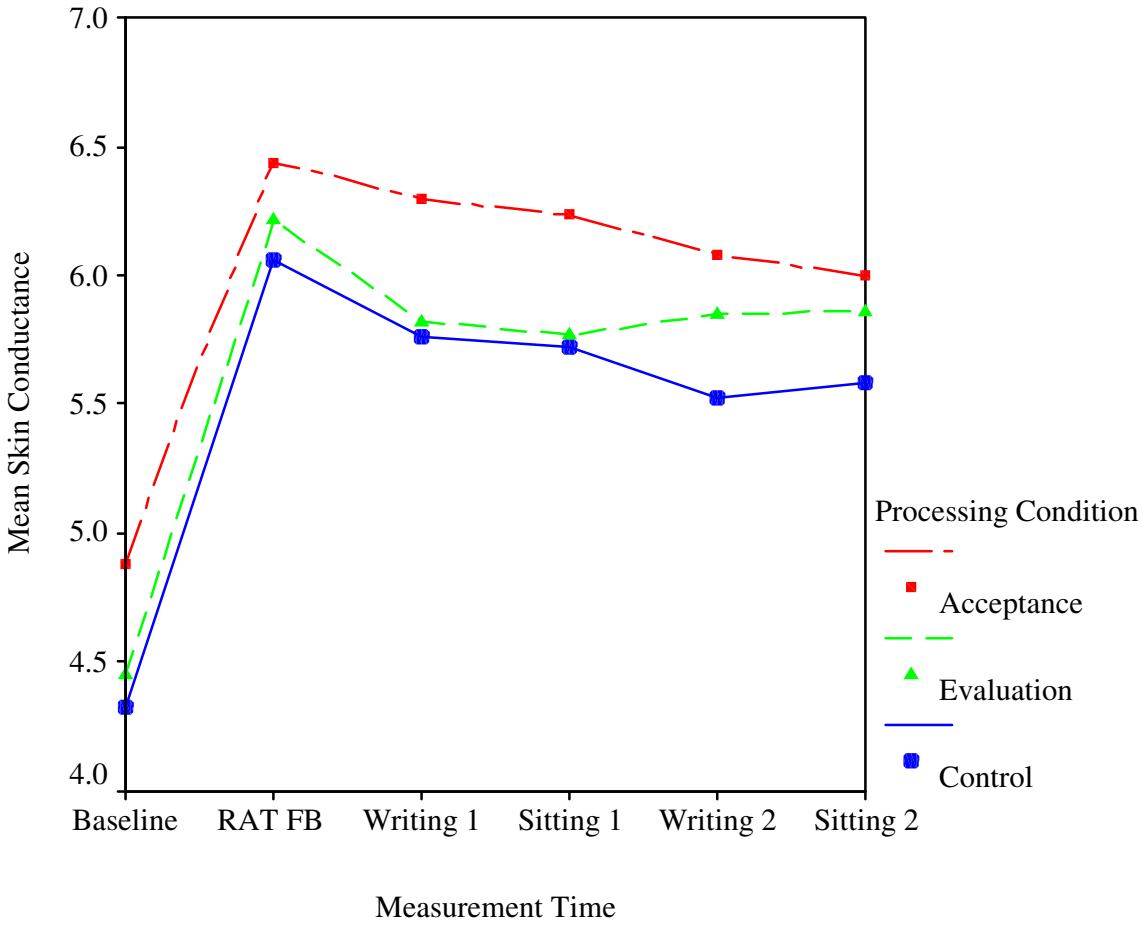
Appendix FF

Mean Heart Rate across Time for Emotional Processing Conditions



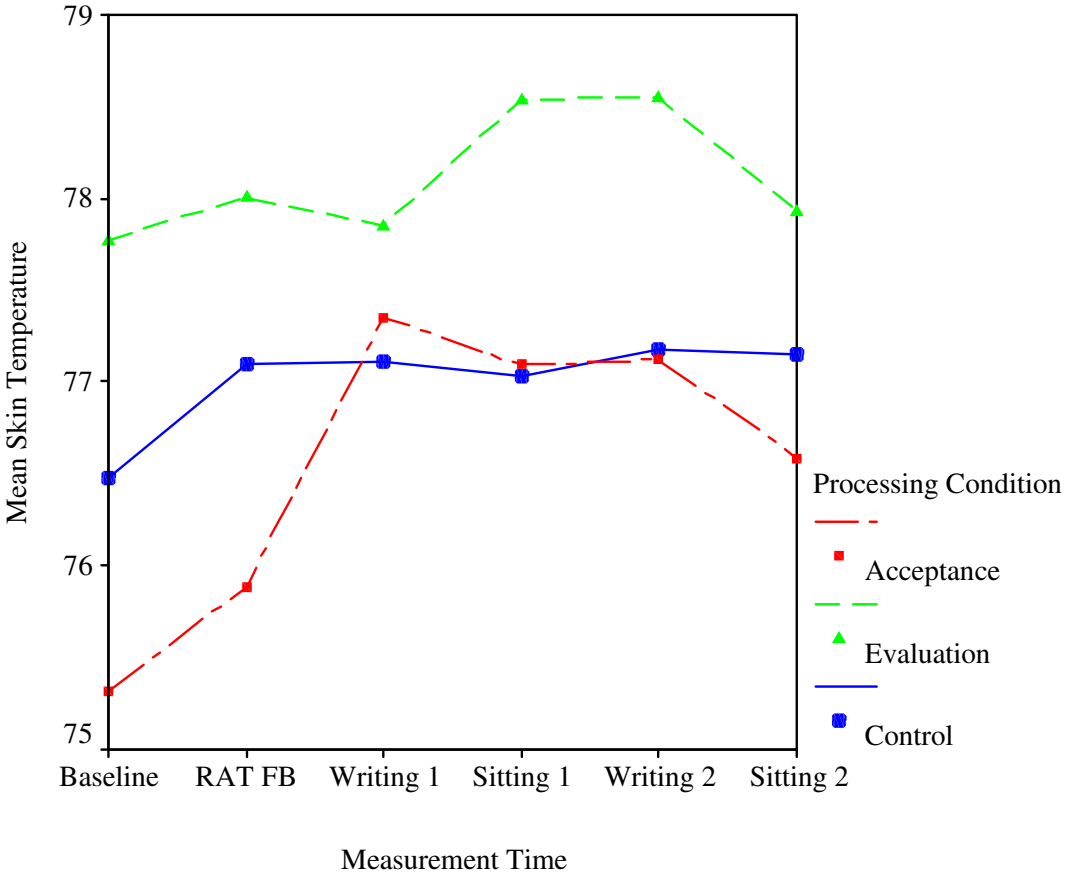
Appendix GG

Mean Skin Conductance across Time for Emotional Processing Conditions



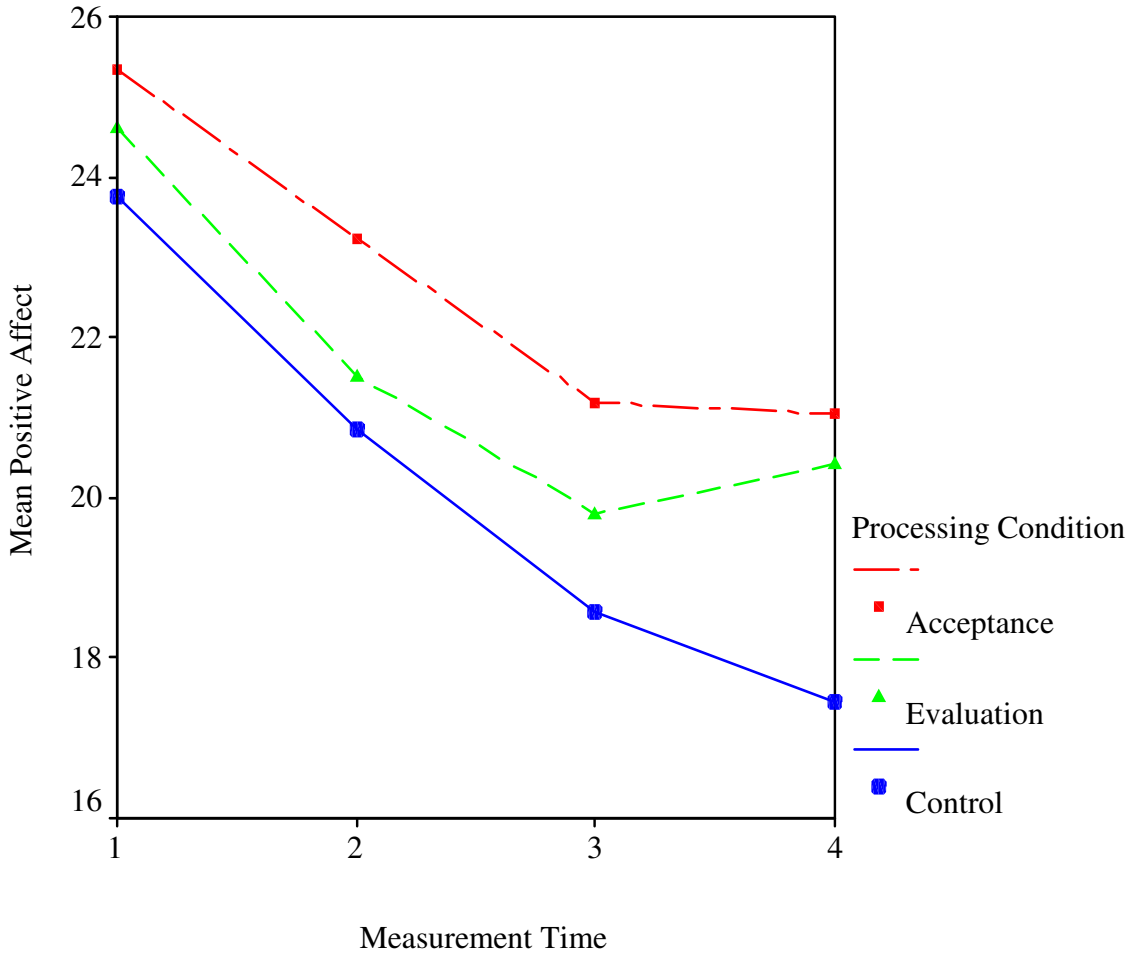
Appendix HH

Mean Skin Temperature across Time for Emotional Processing Conditions



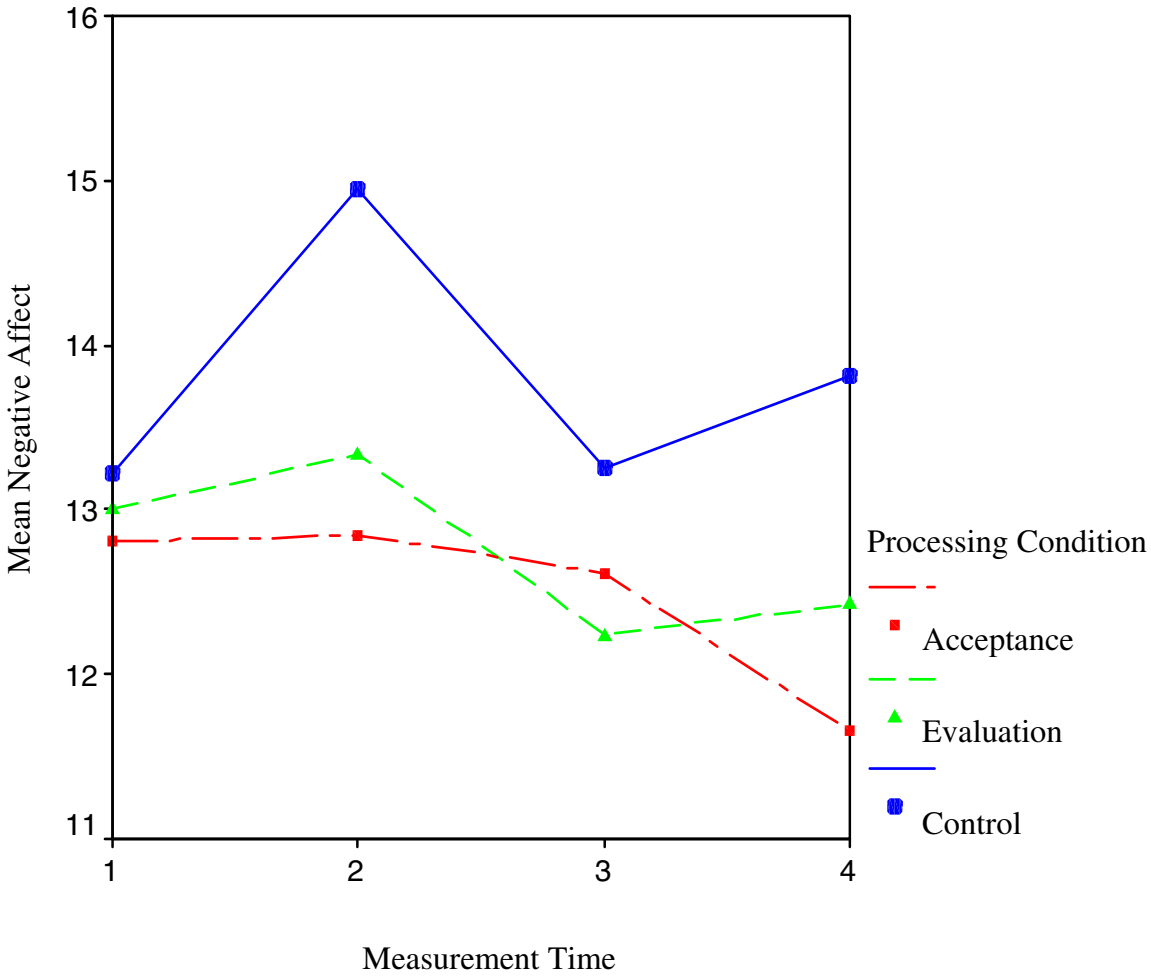
Appendix II

Mean Self-Reported Positive Affect across Time for Emotional Processing Conditions



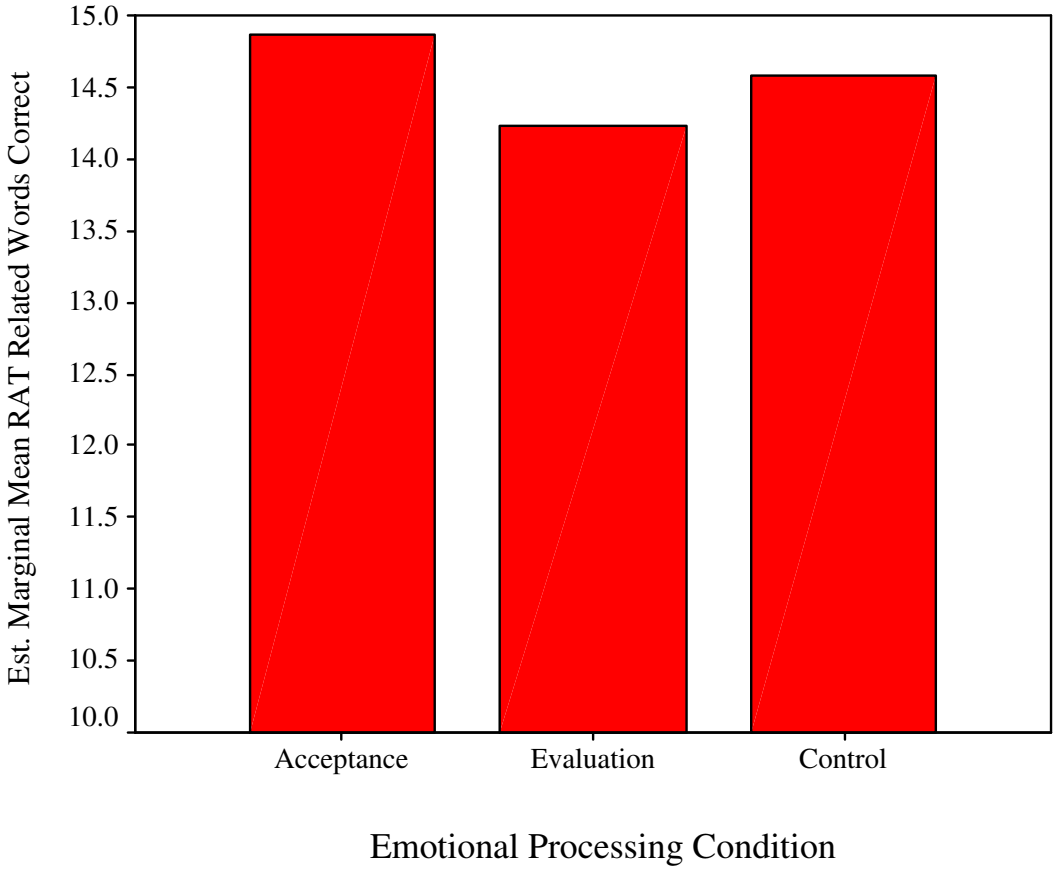
Appendix JJ

Mean Self-Reported Negative Affect across Time for Emotional Processing Conditions



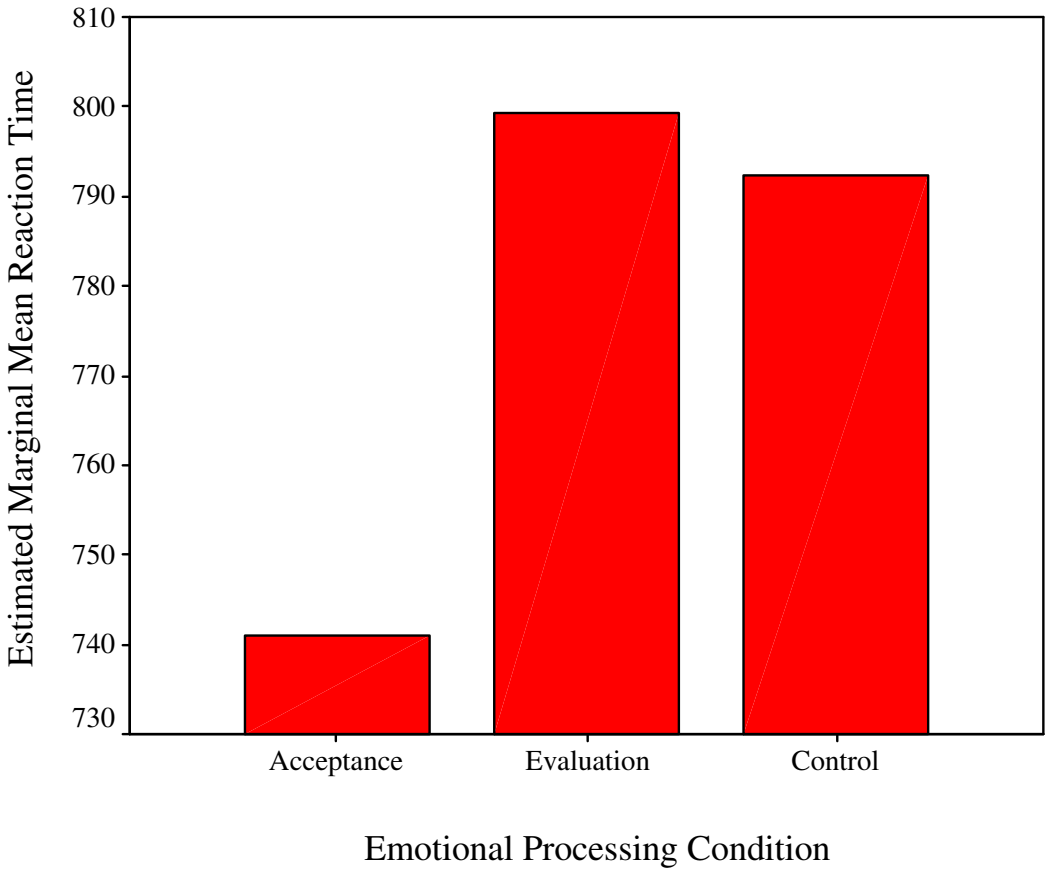
Appendix KK

Mean Number of Correct RAT Related Words for Emotional Processing Conditions



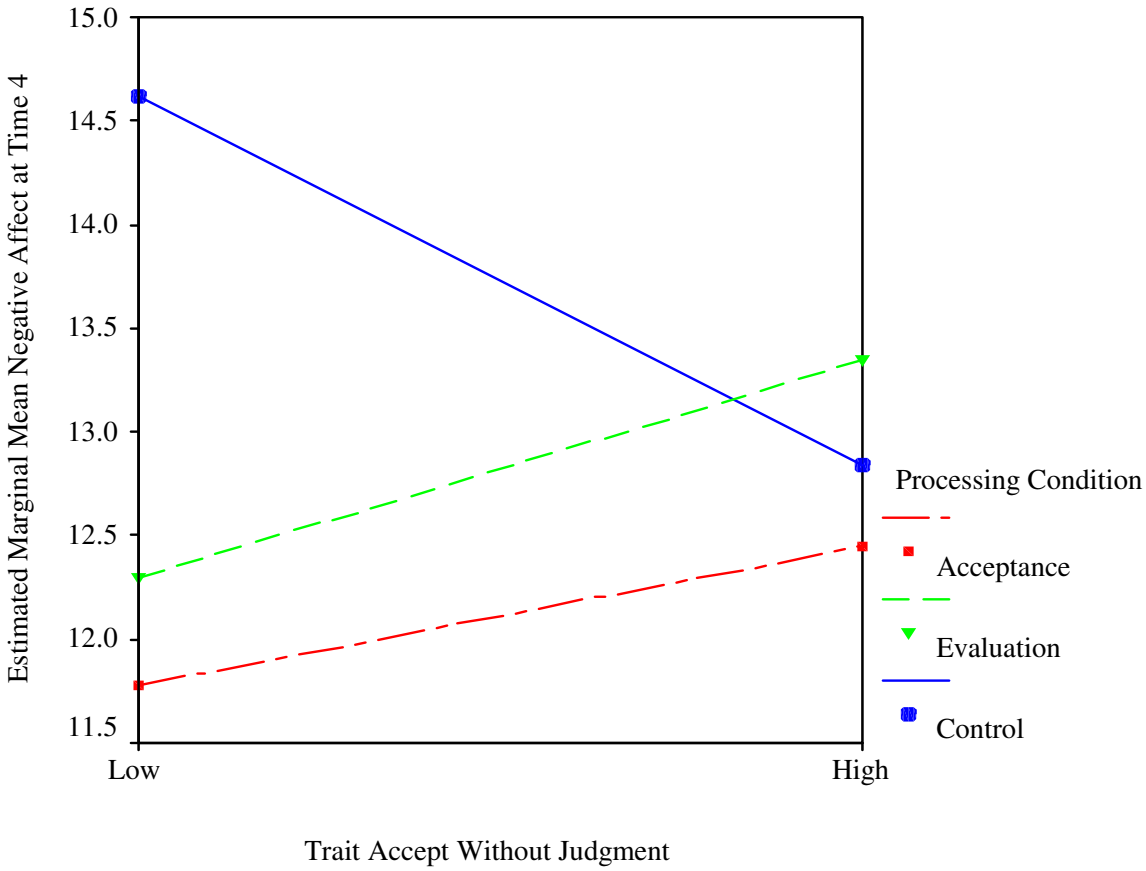
Appendix LL

Mean Reaction Time to Correctly Answered RAT Related Words for Emotional Processing Conditions



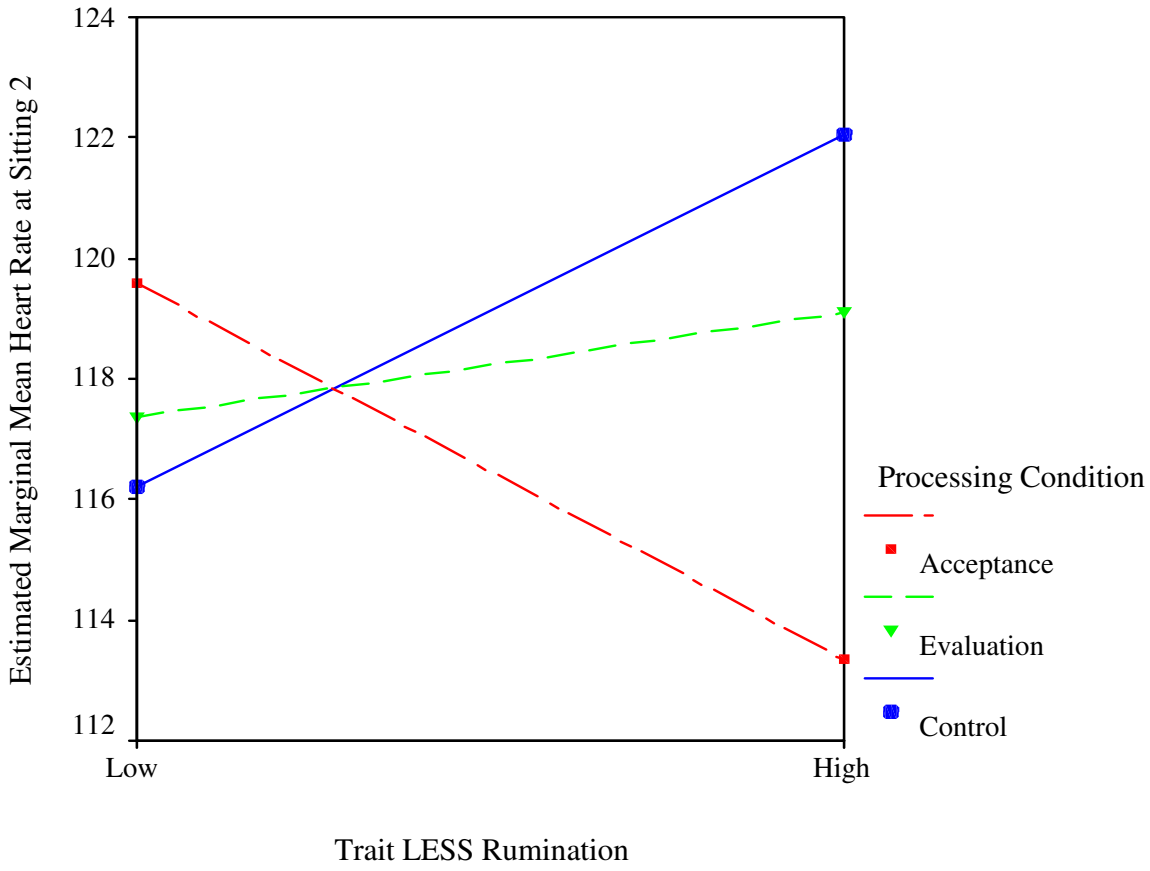
Appendix MM

Mean Self-Reported Negative Affect for High and Low Trait Accept Without Judgment at Time 4 for Each Emotional Processing Condition



Appendix NN

Mean Heart Rate for High and Low Trait Rumination at Sitting 2 for Each Emotional Processing Condition



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